

Before the  
COPYRIGHT ROYALTY BOARD  
LIBRARY OF CONGRESS  
Washington, D.C.

In the Matter of:

DETERMINATION OF RATES AND  
TERMS FOR MAKING AND  
DISTRIBUTING PHONORECORDS  
(Phonorecords IV)

Docket No. 21-CRB-0001-PR  
(2023-2027)

**WRITTEN DIRECT STATEMENT  
OF COPYRIGHT OWNERS**

**VOLUME IV.B**

**PUBLIC VERSION**

Before the  
UNITED STATES COPYRIGHT ROYALTY JUDGES  
Library of Congress  
Washington, D.C.

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*In re*

DETERMINATION OF RATES  
AND TERMS FOR MAKING AND  
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(Phonorecords IV)

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) Docket No. 21-CRB-0001-PR  
) (2023-2027)  
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WRITTEN DIRECT TESTIMONY OF ROBIN FLYNN

Expert Witness for Copyright Owners

October 13, 2021

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**I. Background and qualifications**

1. I am an independent consultant with deep expertise in the media industry. I graduated from Duke University with a bachelor's degree in 1983 and obtained an MBA in International Management in 1988 from the Monterey Institute of International Studies. I joined Paul Kagan Associates ("Kagan"), a leading source of media and telecommunications data and financial analysis, in January 1988, and I remained there until July 2020, ultimately becoming Senior Analyst/Director and assuming leadership of the Media Research group at Kagan. I have over 33 years of experience in analyzing the media industry and publishing research, including the streaming media, broadcast and multichannel industries.

2. Kagan is currently an offering of S&P Global Market Intelligence, which provides an online interactive database and market intelligence tool offering data and information in areas including online video, streaming media, broadcast TV, radio, multichannel, TV networks, satellite television, motion pictures and wireless/mobile media in the United States and internationally. Kagan publishes hundreds of articles annually, and provides proprietary interactive data, newsletters and reports. This research is largely dedicated to chronicling the value, trends and economics of media and communications industries. Kagan's perspective and historical databases are regularly used by senior executives in the fields of media operations and finance to plan and execute their businesses. The Kagan team also presents a series of webinars and conferences, bringing together key players in the media and communications sectors to participate in panel and keynote appearances.

3. During my time at Kagan from January 1988 to July 2020, I assumed increasing leadership of Kagan Research and eventually the overall S&P Global Market Intelligence industry



research groups, while publishing hundreds of analyses and data sets. From 2015 to 2019, I was initially Director and subsequently Senior Director for Research, overseeing dozens of media analysts publishing numerous reports and data sets on the media industry. From June 2019 to July 2020, as Managing Director, I led a group of over 135 global Research staff publishing thousands of articles and reports annually, plus hundreds of projections and data sets in multiple industries. This output included hundreds of articles and reports focused on the media industry, and dozens of projections and data sets.

4. During more than three decades at Kagan I authored or contributed to hundreds of reports on the media industry. I had a particular focus on broadcast, cable and the growth of streaming media, specifically TV, radio stations, streaming music and their industries. I led a group that tracked digital radio, streaming music and video, as well as actively analyzing the industry and appearing on panels related to streaming audio. The reports and analyses I have authored, edited or supervised included the topics of streaming audio and digital radio in publications such as *The Economics of Internet Music and Radio*, *Broadcast Investor*, *Internet Media Investor*, and *Economics of Mobile Music*.

5. While at Kagan, I moderated or spoke at more than 100 industry, company events and conferences and performed or supervised dozens of consulting and valuation assignments in the media industry. I have valued billions of dollars of cable and broadcast properties under contract assignment over the last three decades.

6. Although serving as an expert witness was not a chief activity of mine or of Kagan's senior analysts in general, over the past years, I have been retained and testified as an expert in matters concerning the streaming music, broadcast, cable television and DBS industries. My

testimony has focused on industry trends and valuation matters. More information about my publishing activities, consulting activity and past expert assignments can be found in my CV, provided as Appendix A to this statement. Appendix B to this statement provides a list of my prior publications.

7. I am being compensated in connection with my work and any testimony I may provide in this matter within the range of my ordinary rates. My compensation is not contingent on the substance of my opinions or on the outcome of this proceeding.

## **II. Assignment and summary of conclusions**

8. I have been retained by Counsel for the National Music Publishers' Association ("NMPA") and Nashville Songwriters Association International ("NSAI," collectively, "Copyright Owners") to evaluate the U.S. interactive music streaming market and provide my expert opinion on the facts and dynamics of that market, particularly any factors that I believe bear upon the Judges' task of setting the proper rates and terms for compulsory mechanical licenses for interactive streaming in the United States for the period of 2023 to 2027.

9. In formulating my opinions and responses to the foregoing issues, I have reviewed numerous materials, including certain filings and reports in the previous Phonorecords proceedings; documents produced in this matter and in the prior Phonorecords proceeding, including operating and financial data and internal corporate documents; certain exhibits from the Webcasting V proceeding; public filings from parties to this proceeding; media and analyst reports concerning the music streaming industry; and other publicly available information concerning the major streaming services and their industries. The materials I have reviewed and relied upon in

formulating my opinions are set forth in the footnotes throughout the report, with additional such materials also listed in Appendix C.

10. Based on my review and analysis of the evidence , and my professional experience and knowledge, I have the following opinions:

- The interactive music streaming market, which has grown into the predominant way that consumers access music, has become highly concentrated within a limited number of large diversified companies, some of which, based on their equity value, are the largest companies in the world.
- Apple, Amazon and Alphabet (Google) are three of the largest companies in the world and have grown dramatically in the last five years, in terms of revenues and public market capitalization. The overall revenues that they generate from their other product and business lines dwarf revenues that they derive from their music streaming offerings. However, their music streaming offerings contribute profit to their businesses by bringing and keeping consumers in their ecosystems and by supporting the growth of complementary business lines.
- To compete for customers for their music streaming offerings, who then become consumers of these companies' larger ecosystems, the services have an economic incentive to, and do, keep music streaming prices low. These companies do not have any need or incentive to try to maximize their revenues or profits from their music streaming services but instead have a distinct economic incentive to maximize their revenues and profits across all their complementary products and services.
- The big tech companies with broad ecosystems use additional discounts to music

pricing as an attraction to build their brand and consumer involvement in their larger ecosystems, aggregate and exploit user data and maximize revenues from other business lines.

- Spotify and Pandora have also evolved beyond pureplay music streaming services into diversified companies. Spotify’s market capitalization, since its public offering, has dramatically increased, reflecting the present value of the company’s expected future profits.
- The streaming services in the interactive music streaming market offer products that are commoditized – the streaming services all offer roughly the same core music content. In contrast to their behavior in other markets, including podcasts and video streaming, the Services do not appear to compete on price with one another on their music products to obtain exclusive content.
- Many of the streaming market arguments raised by Copyright Owners five years ago in *Phonorecords III* did bear out in the market, and many of their concerns expressed are even more pronounced in the current market.

### **III. Streaming has become the predominant way America listens to music**

11. Streaming has grown substantially since the last Phonorecords proceeding to become the predominant way American consumers listen to music, with interactive streaming services capturing the majority of industry revenues.<sup>1</sup>

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<sup>1</sup> **COEX-8.1** – Joshua Friedlander, “Mid-Year 2021 RIAA Revenue Statistics,” Recording Industry Association of America, (Sept. 13, 2021).

12. For the first half of the last decade (2010 to 2015), interactive streaming in the U.S. was in its infancy. In 2010, the only interactive streaming service available in America was Rhapsody, which had launched in 2001.<sup>2</sup> Slacker and Spotify entered the U.S. interactive streaming market ten years after Rhapsody's launch, in 2011.<sup>3</sup> In that year, there were just 1.8 million subscribers to on-demand music services in the U.S.<sup>4</sup>

13. The "Big Tech" firms – Amazon, Apple and Google – followed Spotify into the interactive music streaming market during the course of the five years following Spotify's entry into the United States market, with the launches of Google Play Music in 2013,<sup>5</sup> Apple Music in 2015,<sup>6</sup> and Amazon Music Prime in 2014 and Amazon Music Unlimited in 2016.<sup>7</sup> Other competing platforms also launched during this period, including TIDAL launching in 2014 (with a 2015 relaunch)<sup>8</sup> and Pandora launching its Premium interactive music streaming service in 2017.<sup>9</sup>

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<sup>2</sup> Gwendolyn Mariano, "Listen.com Launches Rhapsody Service," ZDNet (Dec. 3, 2001), <http://www.zdnet.com/article/listen-com-launches-rhapsody-service/>.

<sup>3</sup> Carol Mangis, "Slacker Premium Radio launches today," Consumer Reports (May 17, 2011) <https://www.consumerreports.org/cro/news/2011/05/slacker-premium-radio-launches-today/index.htm>; **COEX-8.2** – Charlie Sorrel, "Spotify Launches in the U.S at Last," Wired (July 14, 2011) <https://www.wired.com/2011/07/spotify-launches-in-the-u-s-at-last/>.

<sup>4</sup> **COEX-8.3** – Joshua Friedlander, "News and Notes on 2014 RIAA Music Industry Shipment and Revenue Statistics," Recording Industry Association of America.

<sup>5</sup> **COEX-8.4** – Josh Constine, "Google Launches 'Google Play Music All Access' On-Demand \$9.99 A Month Subscription Service," TechCrunch (May 15, 2013) <https://techcrunch.com/2013/05/15/google-play-music-all-access/>.

<sup>6</sup> **COEX-8.5** – Ben Popper and Micah Singleton, "Apple announces its streaming music service, Apple Music, Can the tech giant pose a legitimate threat to Spotify?" The Verge (June 8, 2015), <http://www.theverge.com/2015/6/8/8729481/apple-music-streaming-service-wwdc-15>.

<sup>7</sup> **COEX-8.6** – "Now Streaming: Amazon Music Unlimited," Amazon (Oct. 12, 2016) <https://press.aboutamazon.com/news-releases/news-release-details/now-streaming-amazon-music-unlimited>.

<sup>8</sup> Todd Spangler, "Jay Z Launches Tidal Streaming-Music Service At Star-Studded Event," Variety (Mar. 30, 2015), <http://variety.com/2015/digital/news/jay-z-launches-tidal-streaming-music-service-1201462769/>.

<sup>9</sup> **COEX-8.8** – "Pandora Premium Will Change The Way You Listen to Music," Pandora (Mar. 13, 2017)

14. By the end of 2020, the number of U.S. subscribers to interactive music services had increased to 75.5 million (up from 1.8 million in 2011).<sup>10</sup> By the end of the first half of this year, 2021, that figure stood at 82.1 million, with tens of millions of more users streaming full music catalogs on demand through non-subscription ad-supported offerings.<sup>11</sup>

15. Consumption of music across formats has also increased on an average per-consumer basis, with the average amount of time consumers spend listening to music increasing substantially year over year, a trend that has been attributed to streaming.<sup>12</sup>

16. According to a MusicWatch report from last year, 86% of music consumers overall were music streamers.<sup>13</sup> That figure increases to 94% of Millennials aged 27-41 and 93% of Gen Z, aged 13-26. Further, 51% of Millennials were paid subscribers to a streaming service, compared to 40% of Gen Z and 33% overall.<sup>14</sup>

17. This rapidly growing sector of the music industry is replacing other formats by which consumers consume music. According to the MusicWatch 2020 Report, which as noted found that 86% of music consumers stream music, just 9% of those consumers now purchase their music on CDs while 5% purchase vinyl and only 6% purchase digital downloads.<sup>15</sup>

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<https://blog.pandora.com/us/pandora-premium-will-change-the-way-you-listen-to-music/>.

<sup>10</sup> **COEX-8.9** – RIAA Year-End 2020 Revenue Report; RIAA Mid-Year 2021 Revenue Report.

<sup>11</sup> **COEX-8.1** – Joshua Friedlander, “Mid-Year 2021 RIAA Revenue Statistics,” Recording Industry Association of America, (Sept. 13, 2021).

<sup>12</sup> **COEX-8.12** – “Time with Tunes: How Technology is Driving Music Consumption,” Nielsen (Nov. 2, 2017) <https://www.nielsen.com/us/en/insights/article/2017/time-with-tunes-how-technology-is-driving-music-consumption/>.

<sup>13</sup> **COEX-8.13** – “Music Consumer Profile 2020 Report,” MusicWatch. Music Streamers are defined as consumers that listened to music via free or paid online radio/non-interactive or on-demand services in the past year.

<sup>14</sup> *Id.*

<sup>15</sup> *Id.*

**COEX-8.14 –**

18. Growth in the music streaming sector is expected to continue as penetration of premium subscribers grows, consumers depend more on the interactive streaming providers for music and market penetration grows in the growing number of markets served.<sup>16</sup>

**IV. Giant technology companies now dominate the streaming market, with Spotify diversifying to keep up**

**A. The interactive music streaming market is highly concentrated**

19. The interactive music streaming market is dominated by participants that are large, diversified companies focused on maximizing market share in order to use music to attract users for the benefit of their overall businesses. The market has become increasingly concentrated in four such firms: [REDACTED]

[REDACTED]. These four firms alone account for over [REDACTED] % of revenue in this market. [REDACTED]

20. As part of my review of evidence, I reviewed monthly royalty information provided by digital services to the Mechanical Licensing Collective (“MLC”), which provides a picture of the industry. Some of this information is also presented in a chart by Dr. Eisenach, which I have reviewed.<sup>17</sup> As this chart shows, the five streaming services participating in this proceeding represent nearly the entire market by most financial or usage metrics. They represent more than [REDACTED] of declared (music product) revenues, subscribers and plays. The shares of declared

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(Phonorecords III hearing exhibit 546) at GOOG-PHONOIII-00002867.

<sup>16</sup> **COEX-2.9** – “Music in the Air,” Goldman Sachs (April 26, 2021) at 6. It should be noted that these figures represent an increase over Goldman’s previous projections.

<sup>17</sup> *Phonorecords IV*, Written Direct Testimony of Jeffrey A. Eisenach (“Eisenach WDT”), Table: Average Monthly Royalties, Subscribers, Plays, and Declared Revenue.

revenues for these companies is likely higher than this, because [REDACTED], which I understand is due to a definitional loophole being addressed in the *Phonorecords III* remand proceeding.

21. The growth of the Big Tech platforms in the space has been meteoric. Apple launched in June of 2015,<sup>18</sup> after Spotify Amazon and Google, and has outstripped them in individual growth since then. While eschewing any ad-supported “funnel” offering, Apple had [REDACTED] through May, serving [REDACTED] monthly plays.<sup>19</sup> Amazon entered the space in June 2014 and October 2016 with Prime Music and Amazon Music Unlimited, respectively. In 2021, it had [REDACTED] average U.S. subscribers, with [REDACTED] average monthly plays.<sup>20</sup> Alphabet Inc.’s YouTube Music Premium service launched in June 2018 (along with the ad-supported YouTube Music), following various music service offerings under its YouTube and Google Play Music brands.<sup>21</sup> The music service operated in parallel for a time with the company’s legacy music service, Google Play Music. Google Play Music was sunset in December 2020, leaving YouTube Music Premium as Alphabet’s interactive music streaming service.<sup>22</sup> Google’s average monthly subscribers in 2021 were [REDACTED], and its average monthly plays through May 2021 were [REDACTED].<sup>23</sup>

<sup>18</sup> **COEX-8.24** – “Introducing Apple Music — All The Ways You Love Music. All in One Place,” Apple (June 8, 2015) <https://www.apple.com/newsroom/2015/06/08Introducing-Apple-Music-All-The-Ways-You-Love-Music-All-in-One-Place/>

<sup>19</sup> See Eisenach WDT, Table: Average Monthly Royalties, Subscribers, Plays, and Declared Revenue.

<sup>20</sup> *Id.*

<sup>21</sup> **COEX-8.27** – Dani Deahl, “YouTube Music and YouTube Premium officially launch in US, Canada, UK, and other countries,” The Verge (June 18, 2018) <https://www.theverge.com/2018/6/18/17475122/youtube-music-premium-launch-us-canada-uk>.

<sup>22</sup> **COEX-8.28** – Sarah Perez, “Google Play Music to shut down starting in September, will disappear by December,” TechCrunch <https://tcrn.ch/2BZST7M>.

<sup>23</sup> See Eisenach WDT, Table: Average Monthly Royalties, Subscribers, Plays, and Declared Revenue.



22. Spotify has also continued to grow rapidly, both in the U.S. and globally. The company increased its total international MAUs (“MAUs” refers to monthly active users) significantly over the past several years: total MAUs grew 22% on an annual basis to 365 million as of the end of Q2 2021, versus 299 million in Q2 2020 and 232 million in Q2 2019.<sup>24</sup> Premium subscribers grew 20% to 165 million in Q2 2021, versus 138 million in Q2 2020.<sup>25</sup> In its July 2021 press release announcing Q2 2021 results, the company projected expanding to 400 million to 407 million MAUs by the end of the year, along with 177 million to 181 million premium subscribers.<sup>26</sup> Spotify’s average monthly subscribers in the U.S. in 2021 through May were [REDACTED], while its average monthly plays were [REDACTED].<sup>27</sup>

23. Pandora (now part of satellite radio provider Sirius XM Holdings, Inc.) entered the market with a limited offering, Pandora Plus, in September 2016 and launched its full on-demand interactive streaming music product in March 2017. At the end of Q2 2021, Pandora had 55.1 million monthly active users to all its services, versus 59.6 million as of June 30, 2020 and 71.4 million as of June 30, 2018, reflecting a 23% decline since June 2018.<sup>28</sup> Pandora’s paying subscribers rose to 6.5 million in June 2021 from 6.3 million as of June 30, 2020.<sup>29</sup>

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<sup>24</sup> **COEX-8.31** – Spotify 2020 Q2 Press Release; Spotify 2021 Q2 Press Release at 1.

<sup>25</sup> *Id.*

<sup>26</sup> *Id.*

<sup>27</sup> See Eisenach WDT, Table: Average Monthly Royalties, Subscribers, Plays, and Declared Revenue.

<sup>28</sup> **COEX-8.32** – Sirius XM 2021 Q2 Financial Report at 43; Sirius XM 2019 Q2 Financial Report at 55.

<sup>29</sup> **COEX-8.32** – Sirius XM 2021 Q2 Financial Report at 43.

24. The market may see even further consolidation, including at the very top. Spotify has not surprisingly been named as a company likely to be acquired because of its smaller scale as compared to Apple, Amazon, and Google.<sup>30</sup>

**B. The Big Tech Services have grown dramatically and in unprecedented ways over the past five years**

25. Apple, Amazon and Google collectively represent [REDACTED]. On an enterprise-wide level, these corporations represented \$ [REDACTED] of market capitalization on September 30, 2021.<sup>31</sup> As of April 2021, they were the 1st (Apple), 4th (Amazon), and 5th (Alphabet) largest companies in the world by market capitalization.<sup>32</sup>

26. Apple Inc., the largest company in the world by market cap, had a market capitalization of \$ [REDACTED] as of September 30, 2021.<sup>33</sup> It is engaged in a diverse array of business activities, including designing, manufacturing, and marketing smartphones, personal computers, tablets, wearables and accessories and selling a variety of related services. It sells services related to advertising and the cloud as well as offering AppleCare. Apple’s digital content offerings include its App Store, its television platform (Apple TV+), and its music platform (Apple Music).<sup>34</sup>

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<sup>30</sup> **COEX-8.34** – Tim Ingham, “Who Will Own Spotify in Five Years,” Rolling Stone (Aug. 29, 2019) <https://www.rollingstone.com/pro/features/who-will-own-spotify-in-five-years-876693/>. (“Unlike Apple Music, Tencent Music, YouTube Music, and Amazon Music, its biggest global rivals, Spotify’s music service doesn’t drive revenues in other, wildly lucrative areas (for Apple, device sales; for Amazon, e-store sales and Prime memberships; etc.)”). The same article notes that “many industry insiders suggest[] Spotify will eventually, inevitably, end up under the ownership of a larger corporation.”

<sup>31</sup> **COEX-8.184** – S&P Capital IQ.

<sup>32</sup> **COEX-8.35** - Andrea Murphy et al., “Global 2000,” Forbes (May 13, 2021) <https://www.forbes.com/lists/global2000/#4036f89e5ac0>

<sup>33</sup> **COEX-8.184** – S&P Capital IQ.

<sup>34</sup> **COEX-8.36** – Apple 2020 Annual Report at 2.

27. In the fiscal year ended September 2020, Apple’s net sales were \$274.5 billion, of which \$53.8 billion was allocated to the Services segment of which music forms a part. The gross margin on the services segment during this period was 66%.<sup>35</sup> Apple’s EBITDA (Earnings before Interest, Taxes, Depreciation and Amortization, a measure of cash flow) was \$ [REDACTED], and net income \$57.4 billion.<sup>36</sup> Apple’s reported service revenue for its interactive streaming service in the fiscal year ended September 2020 in the U.S. totalled \$ [REDACTED],<sup>37</sup> which is [REDACTED]% of its total net sales for the year.

28. Alphabet Inc., the fourth largest company in the world by market cap, had a market capitalization of \$ [REDACTED] as of September 30, 2021.<sup>38</sup> Alphabet provides online advertising services such as in the areas of performance advertising and brand advertising and other services in the United States and globally. It reports its results through its Google Services, Google Cloud, and its “Other Bets” segments. The Google Services segment provides products and services such as advertising products and solutions, Android, Chrome, hardware, Google Maps, Google Play, and YouTube, as well as digital content and subscription-based products such as YouTube Premium.<sup>39</sup>

29. Alphabet generated revenue of \$182.5 billion in 2020, of which “Google Services” contributed \$168.6 billion. Advertising contributed 80% of Alphabet’s revenue in 2020. Alphabet

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<sup>35</sup> *Id.*

<sup>36</sup> *Id.*; **COEX-8.184** – S&P Capital IQ. EBITDA is a commonly used measure of operating cash flow for a company. It does not include non-operating expenses, primarily including depreciation and amortization. EBITDA as used in this report adds depreciation and amortization back to operating income. In Apple’s case for 2020, depreciation and amortization expense of \$ [REDACTED] was added back to operating income of \$ [REDACTED] to arrive at EBITDA of \$ [REDACTED].

<sup>37</sup> *See* Eisenach WDT, Appendix C.

<sup>38</sup> **COEX-8.184** – S&P Capital IQ.

<sup>39</sup> **COEX-8.37** – Alphabet 2020 Annual Report at 6.

realized \$ [REDACTED] of EBITDA and net income of \$40.3 billion the same year.<sup>40</sup> In 2020, Google reported U.S. interactive music streaming service revenue of \$ [REDACTED], or [REDACTED]% of Alphabet's total revenue for the year.<sup>41</sup>

30. Amazon.com, Inc., the fifth largest company in the world by market cap, had a market capitalization of \$ [REDACTED] as of September 30, 2021.<sup>42</sup> Amazon is a multi-national e-commerce conglomerate that sells a wide range of products and services via Amazon.com and other outlets and offers cloud services via Amazon Web Services (AWS). Amazon offers Amazon Prime, a membership program that offers unlimited free shipping on over 100 million items, access to unlimited streaming of tens of thousands of TV episodes and movies (including Amazon original content), and other services, including the Amazon Music Prime offering. The company also manufactures and sells electronic devices, including Echo-brand smart speakers, Kindle, Fire tablets, Fire TV, Ring and other devices.<sup>43</sup>

31. Amazon generated net sales of \$386.1 billion in 2020, an increase of 38% versus 2019's net sales of \$280.5 billion.<sup>44</sup> Amazon's \$386.1 billion of revenue makes it the second-largest company in the U.S. by revenue, eclipsed only by Walmart and followed by Apple.<sup>45</sup> Amazon generated EBITDA of \$ [REDACTED] and net income of \$21.3 billion in 2020.<sup>46</sup> However, Amazon's reported revenues are only a portion of Amazon's overall retail impact. Amazon is an

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<sup>40</sup> COEX-8.37 – Alphabet 2020 Annual Report at 29, 33; COEX-8.184 – S&P Capital IQ.

<sup>41</sup> See Eisenach WDT, Appendix C.

<sup>42</sup> COEX-8.184 – S&P Capital IQ.

<sup>43</sup> COEX-8.38 – Amazon 2020 Annual Report at 3.

<sup>44</sup> COEX-8.38 – Amazon 2020 Annual Report at 18.

<sup>45</sup> COEX-8.39 – Fortune 500 List (2021), <https://fortune.com/fortune500/2021/search/>. Alphabet Inc. is the country's ninth-largest company by revenue.

<sup>46</sup> COEX-8.38 – Amazon 2020 Annual Report at 18; COEX-8.184 – S&P Capital IQ.

e-commerce giant, with the majority of its revenue derived from its “online store” sales and “third-party seller services.”<sup>47</sup> Amazon does not report the gross value of its third-party seller revenues – only what it derives in commissions and fees. These two revenue sources generated 72% of Amazon’s \$386 billion of revenue in 2020. Amazon generated 68% of its revenues from the U.S. in 2020.<sup>48</sup> Amazon’s interactive music streaming offerings generated U.S. music service revenue of \$ [REDACTED] in 2020, or [REDACTED]% of Amazon’s overall revenue.<sup>49</sup>

32. Including the gross value of sales attributable to its third party seller revenues, Amazon generates hundreds of billions of gross merchandise value, which are estimated to have reached close to \$500 billion in 2020.<sup>50</sup> This level of retail revenues would make it the second largest company in the world by revenue,<sup>51</sup> second only to Walmart, which had revenues of \$ [REDACTED] in the 12 months ended January 31, 2021.<sup>52</sup> Beyond its rise in the music streaming space, Amazon’s rise in market size and dominance has also grown substantially since *Phonorecords III*. In Fortune’s 2016 rankings, Amazon was the 44th largest company in the world

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<sup>47</sup> Amazon says its third party revenue stream “Includes commissions and any related fulfillment and shipping fees, and other third-party seller services.” (COEX-8.38 – Amazon 2020 Annual Report, at 25). This revenue stream represents only the commissions and related revenue flowing to Amazon, it does not represent the retail value of goods sold on Amazon.com.

<sup>48</sup> COEX-8.38 – Amazon 2020 Annual Report at 66.

<sup>49</sup> See Eisenach WDT, Appendix C.

<sup>50</sup> Some estimates have the “gross merchandise value” of Amazon’s business as of 2020 at actual retail sales at \$475 billion - \$490 billion, versus Amazon’s reported online store revenues of \$197 billion in 2020. COEX-8.40 – Pamela N. Danziger, Amazon’s Third-Party Marketplace Is Its Cash-Cow Not AWS, *Forbes* (Feb. 5, 2021) <https://www.forbes.com/sites/pamdanziger/2021/02/05/amazons-third-party-marketplace-is-its-cash-cow-not-aws/> and COEX-8.41 – Daniela Coppola, “Global Gross Merchandise Volume (GMV) of Amazon from 2018 to 2020 by seller type,” *Statista* (Aug. 11, 2021) <https://www.statista.com/statistics/591317/amazon-gross-merchandise-value/>.

<sup>51</sup> COEX-8.39 – Fortune 500 List (2021), <https://fortune.com/fortune500/2021/search>.

<sup>52</sup> COEX-8.184 – S&P Capital IQ. Including Amazon’s other revenue streams, such as for AWS, Subscription services and “other” revenues would push it over Walmart’s \$ [REDACTED].

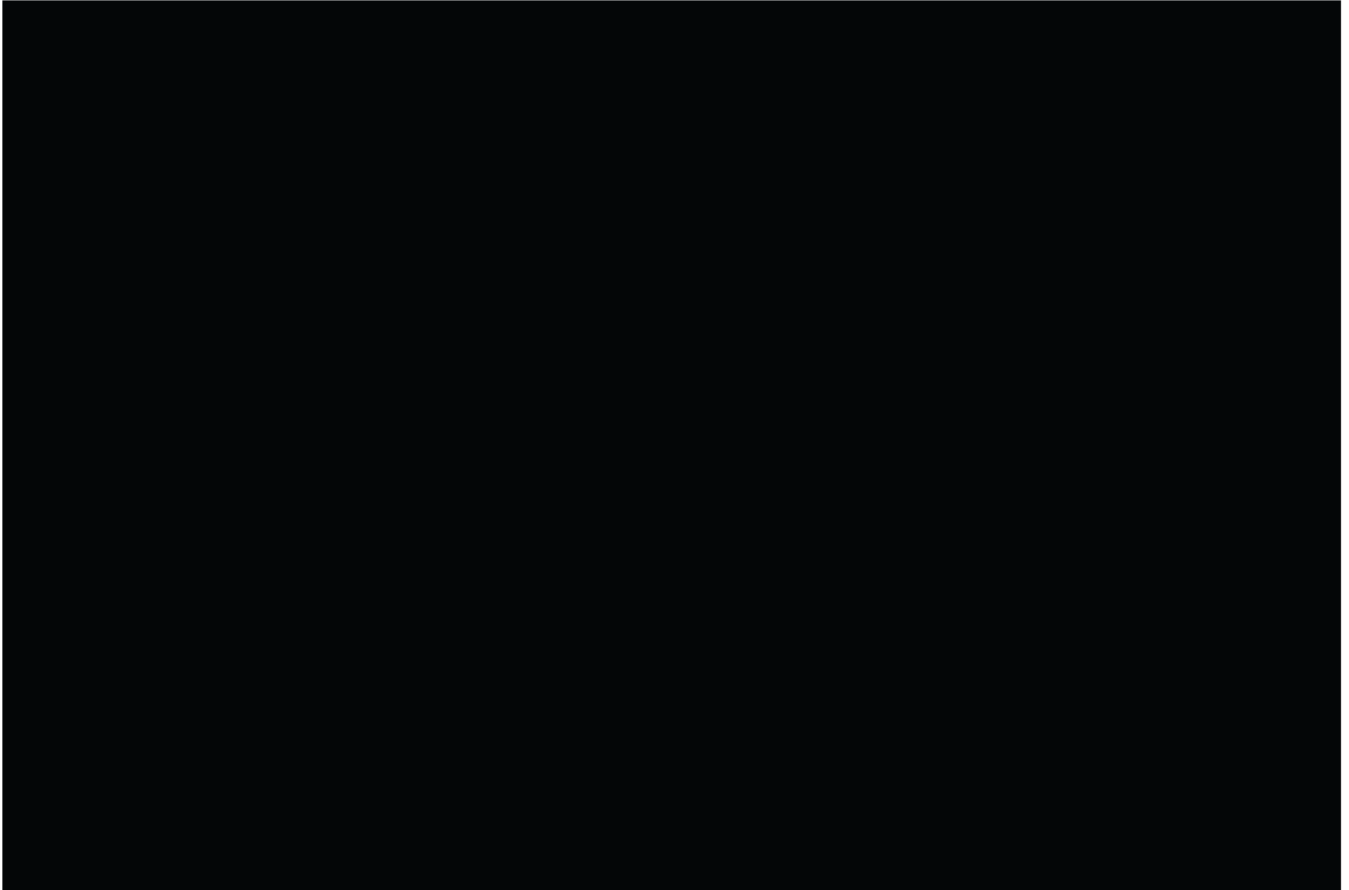
by revenues. Today it is the third largest in the world, and by far the largest in the digital space.<sup>53</sup> Amazon's reported revenues of \$386.1 billion for 2020 were \$105.5 billion dollars larger than they were in 2019, a growth of 38%. That one-year growth alone would be equivalent to the 26th largest company in the U.S. by revenues, meaning Amazon's revenues are now *growing* annually by about where its entire revenues were in 2015, immediately before *Phonorecords III* commenced.<sup>54</sup>

33. Figure 1 shows total market capitalization growth for Apple, Alphabet, and Amazon since 2015:

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<sup>53</sup> Amazon (\$386.1 billion 2020 revenues) comes in narrowly behind the second largest company in the world by revenue – that company is State Grid, the largest of China's two state-owned electric utility operators, which had \$386.6 billion in 2020 revenues. **COEX-8.42** – Fortune 500 Global List (2021), <https://fortune.com/global500/2021/search/>.

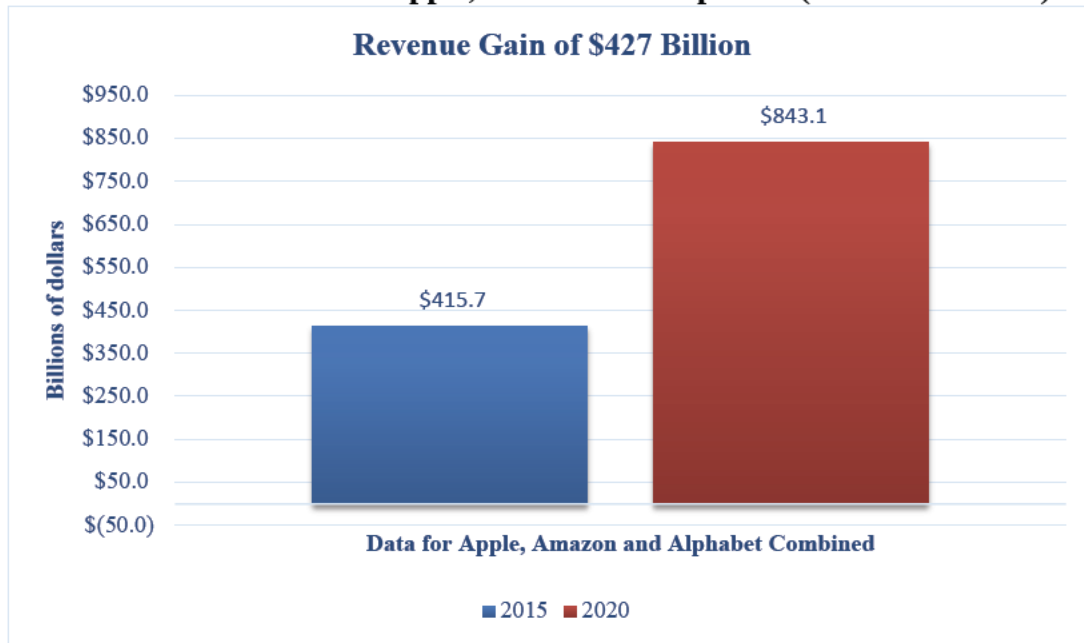
<sup>54</sup> See Janko Roettgers, "Amazon Clocks \$107 Billion In Revenue In 2015," Variety (Jan. 28, 2016) <https://variety.com/2016/biz/news/amazon-clocks-107-billion-in-revenue-in-2015-1201691106/> (last visited October 11, 2021).

**Figure 1:**

*Source: S&P Capital IQ data.*

34. Figure 2 below shows the combined revenue for Apple, Amazon and Google in 2015 versus 2020. Collectively, these mammoth enterprises grossed \$427 billion more in 2020 than they did in 2015 (and as noted above, Amazon’s “gross” only includes a portion of the revenue of its third-party sellers, thereby substantially understating actual retail sales on its online sites):

**Figure 2:**  
**Combined Revenues for Apple, Amazon and Alphabet (2015 versus 2020)**



*Source: Annual reports for Apple, Amazon and Alphabet for 2015 and 2020.*

**C. Spotify has become a diversified company since *Phonorecords III***

35. Although in the past Spotify could be considered a “pure-play” music streaming service, meaning a service whose revenues derive purely from music streaming, Spotify has been focused in recent years on diversifying its business lines beyond music streaming, a goal that it has accomplished. Spotify is now a diversified company earning revenue from activities besides just the subscriptions to and advertisements on its music offerings. This strategy was necessary to reassure investors of its continued growth trajectory and future profit potential, which is based on the opportunity to exploit its large customer base (and related customer data) to drive revenues across multiple business lines.



36. Spotify’s public diversification strategy is centered around its ambitions to become the “audio platform of the world.” As its CEO Daniel Ek explained earlier on Spotify’s first-quarter 2021 earnings call:

I am more confident than ever in our ability to deliver on our ambition to become the world's #1 audio platform. And if you tuned into our Stream On event in February, you probably understand why I’m so bullish. Our strategy to move from being a streaming service to being an audio platform is really starting to come to life. . . . Because the broader audio market is still in its infancy compared to music, the opportunities to innovate there are immense and evolving fast and furiously.<sup>55</sup>

37. Spotify has been openly pursuing diversification of its revenue streams since at least early 2019. In February 2019, for example, Mr. Ek stated that Spotify is looking to move its cost base from “variable to fixed,” meaning that it is looking to bring in a larger share of revenues that do not have to be shared with music copyright owners as they grow.<sup>56</sup>

38. Podcasts are an important part of Spotify’s efforts to diversify its revenue streams. Spotify has recently invested significant sums on exclusive podcast content and is seeking to develop its other non-music offerings, including live audio content. Spotify has spent over \$1 billion on podcast content through April 2021,<sup>57</sup> including gaining exclusive rights to Joe Rogan for more than \$100 million in a deal announced in May 2020<sup>58</sup> and Barstool’s “Call Her Daddy” for \$60 million in June 2021.<sup>59</sup> The Joe Rogan deal marked a watershed moment in the music

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<sup>55</sup> **COEX-8.43** – Spotify 2021 Q1 Earnings Call at 4-5.

<sup>56</sup> **COEX-8.44** – Tim Ingham, “Are Podcasts Threatening the Growth of the Music Industry?” Rolling Stone (Dec. 16, 2019) <https://www.rollingstone.com/music/music-features/podcasts-destroying-music-business-potential-growth-926536/>.

<sup>57</sup> **COEX-2.9** – “Music in the Air,” Goldman Sachs (April 26, 2021) at 13.

<sup>58</sup> **COEX-8.46** – Anne Steele, “Spotify Pays Over \$100 Million for Rogan Podcast,” The Wall Street Journal (May 20, 2020).

<sup>59</sup> **COEX-8.47** – Weston Blasi, “Spotify strikes \$60 million podcast deal with Barstool’s ‘Call Her Daddy,’” MarketWatch (June 17, 2021) <https://www.marketwatch.com/story/spotify-strikes-60-million-podcast-deal-with-barstools-call-her-daddy-11623875822>.

streaming industry given its size and the signal it sent about services' willingness to spend hundred of millions of dollars to obtain exclusive podcast content.

39. Since 2019, Spotify has spent over \$ [REDACTED] in acquiring multiple companies in strategic acquisitions to boost its overall audio offerings.<sup>60</sup> Among recent deals, in March of 2021, Spotify acquired Locker Room in a deal that valued the target company at \$50 million<sup>61</sup> and acquired Podz for an undisclosed price in June 2021.<sup>62</sup> Spotify acquired Anchor, a software company that enables users to create and distribute their own podcasts, for €136 million and Gimlet Media Inc., an independent producer of podcast content, for €172 million.<sup>63</sup>

40. Spotify's diversification plan is not built solely on monetizing its own exclusive podcast content through advertising (although that is certainly one goal), but is also about building its own advertising network and generating revenues brokering the sale of advertising on third-party content, both on and off of its platform. In January 2020, Spotify launched Spotify Podcast Ads, a proprietary technology that allows what Spotify calls "Streaming Ad Insertion (SAI)" for podcasts that, among other thing, will report to advertisers "on the age, gender, device type, and listening behavior of the audience reached."<sup>64</sup> When it launched Spotify Podcast Ads, its Head of Global Ads Business and Platform explained that Spotify was "taking all that's great with podcast

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<sup>60</sup> **COEX-8.33** – Transaction Summary - M&A/Private Placements, S&P Global Capital IQ (Oct. 9 2021). These deals include acquisitions of Betty Labs Inc., Megaphone LLC, The Ringer, Cutler Media LLC, Gimlet Media LLC, and Anchor FM.

<sup>61</sup> **COEX-8.49** – Anne Steele, "Spotify Acquires Sports-Talk App," The Wall Street Journal (Mar. 31, 2021). Locker Room and other live audio apps, which include apps such as Clubhouse and Water Cooler, are voice-based social networks that allow users to freely converse on a number of topics.

<sup>62</sup> **COEX-8.50** – "Spotify buys Podz to improve podcast discovery with AI– Android Central," Olt News (June 18, 2021) <https://oltnews.com/spotify-buys-podz-to-improve-podcast-discovery-with-ai-android-central>.

<sup>63</sup> **COEX-8.51** – Spotify 2019 Q1 Financial Report at 7.

<sup>64</sup> **COEX-8.17** – "Rewriting the Playbook for Podcast Advertising," Spotify (Jan. 2020) <https://ads.spotify.com/en-US/news-and-insights/streaming-ad-insertion-podcast-advertising/>

ads today and adding real-time targeting, measurement, and interactivity to them, none of which exists in the industry as it stands today.”<sup>65</sup> Following Spotify’s acquisition of Megaphone in November 2020, Spotify made Streaming Ad Insertion available to all podcast publishers on Megaphone, which it stated was “the first time this technology will be made available to third-parties.”<sup>66</sup>

41. Spotify continued developing its podcast-related advertising capabilities this year. In February 2021, it announced that it was testing podcast advertisement buying on Spotify Ad Studio, its self-serve advertising platform, and would soon make “audience-based buying, native ad placements, and reporting on creative performance” available to Megaphone podcast publishers and Anchor creators.<sup>67</sup> These tools, along with Spotify Audience Network, are intended to increase advertiser effectiveness and targeting, providing Spotify with an ability to capitalize on a consumer base built on music to drive advertising revenues outside its music business.<sup>68</sup>

42. While Spotify’s customer base was built on its music streaming service, Spotify has seen tremendous growth in its ad revenues from its focus on podcast-related advertising. On

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<sup>65</sup> **COEX-8.18** – “Spotify’s Head of Global Ads Business and Platform Jay Richman Talks New Spotify Podcast Ads,” Spotify (Jan. 8, 2020) <https://newsroom.spotify.com/2020-01-08/spotify-head-of-global-ads-business-and-platform-jay-richman-talks-new-spotify-podcast-ads/>.

<sup>66</sup> **COEX-8.19** – “How Spotify Is Strengthening Our Investment in Podcast Advertising With Acquisition of Megaphone,” Spotify (Nov. 10, 2020) <https://newsroom.spotify.com/2020-11-10/how-spotify-is-strengthening-our-investment-in-podcast-advertising-with-acquisition-of-megaphone/>.

<sup>67</sup> **COEX-8.56** – “A New Era for Podcast Advertising,” Spotify (Feb. 22, 2021) <https://newsroom.spotify.com/2021-02-22/a-new-era-for-podcast-advertising/>.

<sup>68</sup> *Id.* Like other companies selling digital advertising, Spotify is able to use data gleaned from its music users to better target ads and assist advertisers. As its CFO Paul Vogel stated last month: “And then because all of our users come and they log on, we have a lot of great proprietary first party data that allows us to take what we’ve done on the technology side and marry with first party data, it’s been obviously exclusive to Spotify, which is super interesting for advertisers in terms of targeting and measurement and attribution all the things that they’re looking for.” **COEX-8.20** – Spotify Technology S.A. Presents at Bank of America Securities 2021 Media, Communications and Entertainment Conference (Sept. 14, 2021) at 7.

its Q3 2020 earnings call, Spotify's CFO reported that its podcast-related advertising revenue had been "a significant driver of growth in the quarter" and had increased "very significantly from last year."<sup>69</sup> In Q2 2021, Spotify's podcast ad revenue grew some 627% (200% on an organic basis), with overall ad revenue growth at 126%.<sup>70</sup> In its Q2 2021 earnings release, Spotify stated:

Ad-Supported Revenue outperformed our forecast, driven by strong underlying demand (benefiting sellout and pricing) and aided by favorable comps versus last year's COVID-19 lows. The strength in Ad-Supported Revenue was led by our Direct and Podcast sales channels, with the latter benefiting from a triple-digit Y/Y gain at existing Spotify studios (The Ringer, Parcast, Spotify Studios, and Gimlet) along with contributions from the Megaphone acquisition, the exclusive licensing of the Joe Rogan Experience, and Higher Ground. Ad Studio grew 165% Y/Y due to the success of the video product within Ad Studio and international market contributions. We are very pleased with the initial performance of the Spotify Audience Network which launched in the US in April. The rollout allowed us to increase our monetizable podcast inventory in the US by nearly 3x. Additionally, for opted-in podcast publishers we've seen a double digit increase in fill rates, a meaningful increase in unique advertisers, and a double-digit lift in CPMs.<sup>71</sup>

43. During an earnings call in 2020, Mr. Ek responded to the question, "On your recent renewal with UMG, can you confirm this partner has agreed to treat podcasting on your premium tier in the same manner that the other majors have with regard to a carve out of listening time?" by stating, "I think what we have said is that, from a podcasting perspective, the advertising related to podcasting will be 100% Spotify's and not shared."<sup>72</sup>

44. Spotify also recently rolled out "paid subscriptions" for podcasts. Through Spotify's Anchor platform, podcast creators can designate content as subscriber-only and set a

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<sup>69</sup> **COEX-8.43** – Spotify 2020 Q3 Earnings Call at 12.

<sup>70</sup> **COEX-8.43** – Spotify 2021 Q2 Earnings Call at 5.

<sup>71</sup> **COEX-8.31** – Spotify 2021 Q2 Press Release at 4.

<sup>72</sup> **COEX-8.43** – Spotify 2021 Q2 Earnings Call at 15. Analysts have also taken note of this approach. A Bank of America analyst report noted that "[REDACTED]." **COEX-8.57** – Jessica Erlich, "Spotify: Streaming Along," B of A Securities, February 8, 2021.

price for those subscriptions.<sup>73</sup> In 2023, Spotify will begin charging a fee in the amount of 5% of subscription revenue from these paid subscriptions.<sup>74</sup> This fee charged to podcasters will create an additional revenue stream for Spotify. Spotify will also be realizing revenues from this additional stream from the success of podcasting content on third-party platforms: the subscription paywall that podcast creators set up through Anchor can apply not only on the Spotify platform but also on third-party “podcast-listening platforms.”<sup>75</sup> A number of podcast creators have already taken advantage of this paid subscription feature, including NPR.<sup>76</sup>

45. Echoing Mr. Ek’s 2019 statements about Spotify’s efforts to move its cost base from variable to fixed, Spotify’s current CFO Paul Vogel commented at a conference last month that Spotify expects that the “podcasting side” of Spotify’s business presents an opportunity for a “significant benefit” to gross margin:

We think there’s an opportunity to improve the ad margins on the music side alone because right now, they’re lower than the premium side. We think there’s an

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<sup>73</sup> **COEX-8.52** – “Introducing paid subscriptions, made simple for you and your listeners,” Spotify (April 27, 2021) <https://podcasters.spotify.com/blog/paidsubscriptions>; **COEX-8.54** – “Spotify Ushers In New Era of Podcast Monetization With New Tools for All Creators,” Spotify (Apr. 27, 2021) <https://newsroom.spotify.com/2021-04-27/spotify-ushers-in-new-era-of-podcast-monetization-with-new-tools-for-all-creators/>; **COEX-8.53** – Sarah Perez, “Spotify’s Podcasts Subscriptions service is now open to all US creators,” Tech Crunch (Aug. 24, 2021) <https://techcrunch.com/2021/08/24/spotify-podcasts-subscriptions-service-is-now-open-to-all-u-s-creators>.

<sup>74</sup> **COEX-8.52** – “Introducing paid subscriptions, made simple for you and your listeners,” Spotify (April 27, 2021) <https://podcasters.spotify.com/blog/paidsubscriptions>; **COEX-8.54** – “Spotify Ushers In New Era of Podcast Monetization With New Tools for All Creators,” Spotify (Apr. 27, 2021) <https://newsroom.spotify.com/2021-04-27/spotify-ushers-in-new-era-of-podcast-monetization-with-new-tools-for-all-creators/>.

<sup>75</sup> **COEX-8.52** – “Introducing paid subscriptions, made simple for you and your listeners,” Spotify (April 27, 2021) <https://podcasters.spotify.com/blog/paidsubscriptions>; **COEX-8.54** – “Spotify Ushers In New Era of Podcast Monetization With New Tools for All Creators,” Spotify (Apr. 27, 2021) <https://newsroom.spotify.com/2021-04-27/spotify-ushers-in-new-era-of-podcast-monetization-with-new-tools-for-all-creators/>. *See also* **COEX-8.53** – Sarah Perez, “Spotify’s Podcasts Subscriptions service is now open to all US creators,” Tech Crunch (Aug. 24, 2021) <https://techcrunch.com/2021/08/24/spotify-podcasts-subscriptions-service-is-now-open-to-all-u-s-creators> (“Creators who choose to work with Spotify aren’t locked in — they can share private RSS fees with their customers and publish to other platforms, like Apple Podcasts.”)

<sup>76</sup> **COEX-8.54** – “Spotify Ushers In New Era of Podcast Monetization With New Tools for All Creators,” Spotify (Apr. 27, 2021) <https://newsroom.spotify.com/2021-04-27/spotify-ushers-in-new-era-of-podcast-monetization-with-new-tools-for-all-creators/>.

opportunity there. And then you delve into the podcasting side where, as you said, as more and more of our business moves over to a fixed cost nature versus a variable costs nature, we think there's a big opportunity to grow gross margin, on top of the podcasting business.<sup>77</sup>

46. In April earlier this year, Spotify also announced its entry into the electronic device market, with a music player for in-car listening, called Car Thing.<sup>78</sup> Spotify explained that Car Thing was meant to address a need for customers who want a “more seamless” and personalized in-car listening and was part of its larger ubiquity strategy.<sup>79</sup> The product is currently in a limited product launch, but Spotify has indicated that if the device became a full-fledged product, it would cost around \$80.<sup>80</sup>

**D. Pandora has become a diversified company since *Phonorecords III***

47. Pandora, while not as dominant in the interactive streaming market as the three Big Tech Services or Spotify, has also taken steps over the past five years to try, like Spotify, to further diversify its revenue base.

48. Pandora offers a free ad-based music streaming service, which has become a fully interactive streaming offering by virtue of its “Premium Access” feature, which allows users full on-demand functionality after viewing advertising.<sup>81</sup> Pandora also offers an ad-free limited

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<sup>77</sup> **COEX-8.20** – Spotify Technology S.A. Presents at Bank of America Securities 2021 Media, Communications and Entertainment Conference (Sept. 14, 2021) at 12.

<sup>78</sup> **COEX-8.58** – “Spotify Launches Our Newest Exploration: A Limited Release of Car Thing, a Smart Player for Your Car,” Spotify (Apr. 13, 2021) <https://newsroom.spotify.com/2021-04-13/spotify-launches-our-newest-exploration-a-limited-release-of-car-thing-a-smart-player-for-your-car/>.

<sup>79</sup> *Id.*

<sup>80</sup> **COEX-8.59** – Billy Steele, “Spotify's voice-controlled ‘Car Thing’ is available for some subscribers,” engadget (Apr. 13, 2021) <https://www.engadget.com/spotify-car-thing-limited-release-specs-availability-130029605.html>

<sup>81</sup> **COEX-8.66** – Pandora - Upgrade to Pandora Plus or Pandora Premium, [https://help.pandora.com/s/article/Pandora-Premium-Sessions-1519949303783?language=en\\_US#:~:text=Pandora%20Premium%20Sessions,want%2C%20when%20you%20want%20it.](https://help.pandora.com/s/article/Pandora-Premium-Sessions-1519949303783?language=en_US#:~:text=Pandora%20Premium%20Sessions,want%2C%20when%20you%20want%20it.) See also **COEX-8.67** – Pandora 2018 Q1 Press Release at 2 (“Premium Access, which has been used by approximately 13 million listeners to date, continues to showcase the full capabilities of our premiere

subscription service (Pandora Plus) which is playlist-based and has only limited on-demand functionality, for \$4.99/month, and a fully on-demand ad-free subscription service (Pandora Premium) for \$9.99/month.<sup>82</sup>

49. Pandora was acquired by Sirius XM in September 2018 in a bid to expand Sirius XM's business outside of the car radio subscription area.<sup>83</sup> Sirius XM Holdings Inc., which had a market cap of \$ [REDACTED] on September 30, 2021,<sup>84</sup> is itself an operating subsidiary of Liberty Media Corporation.<sup>85</sup>

50. The acquisition had the effect of diversifying Pandora further away from interactive music streaming. Sirius XM has emphasized that its acquisition of Pandora creates significant “cross-promotion opportunities across the combined company’s more than 100 million listeners in North America.”<sup>86</sup> As it explained in its Q1 2019 earnings call, by combining with Pandora, Sirius XM intends to move customers from its combined user base into higher-margin offerings, stating that “inevitably we ought to be able to go fish in a pool of 100 million active free listeners and be able to pull out of that people who are willing to pay and put them into pay products that yield the

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subscription product, for free, following a view of a 15-second ad.”).

<sup>82</sup> Pandora Premium offers an annual discount of \$109.89/year. In addition, AT&T Unlimited Plus customers can acquire Pandora Premium as a free subscription add-on. Pandora Premium costs \$12.99/month if purchased through the iOS App Store through Apple. **COEX-8.65** – Pandora -Premium Access, [https://help.pandora.com/s/article/Upgrade-to-Pandora-Plus-or-Pandora-Premium-1519949306612?language=en\\_US#:~:text=Pandora%20offers%20three%20types%20of,a%20Student%20or%20Military%20discount](https://help.pandora.com/s/article/Upgrade-to-Pandora-Plus-or-Pandora-Premium-1519949306612?language=en_US#:~:text=Pandora%20offers%20three%20types%20of,a%20Student%20or%20Military%20discount).

<sup>83</sup> **COEX-8.60** – Nathan Bomey, “Sirius XM to buy Pandora for \$3.5 billion; how it affects your music,” USA Today (Sept. 24, 2018) <https://www.usatoday.com/story/money/2018/09/24/sirius-xm-radio-pandora-media-acquisition/1408114002/>.

<sup>84</sup> **COEX-8.184** – S&P Capital IQ.

<sup>85</sup> The 2020 10-K Report for Sirius XM Holdings Inc. states that “As of December 31, 2020, Liberty Media Corporation (“Liberty Media”) beneficially owned, directly and indirectly, approximately 76% of the outstanding shares of Holdings’ common stock.” **COEX-8.32** – Sirius XM 2020 Annual Report at 3.

<sup>86</sup> “Sirius XM Completes Acquisition of Pandora,” Sirius XM, Feb. 1, 2019, <http://investor.siriusxm.com/investor-overview/press-releases/press-release-details/2019/SiriusXM-Completes-Acquisition-of-Pandora/default.aspx>.

best margin for our shareholders.”<sup>87</sup> That strategy includes using Pandora’s streaming offerings to boost subscriptions to the Sirius XM service, including through advertising on the Pandora platforms, a strategy Sirius XM refers to as the “Pandora to Sirius path.”<sup>88</sup>

51. Sirius XM’s overall revenues from its non-interactive streaming offerings [REDACTED] [REDACTED] the revenues from Pandora’s subscription interactive streaming offerings. Of Sirius XM’s total 2020 revenue (\$8.04 billion), Pandora’s subscription interactive streaming offerings generated \$ [REDACTED] million in U.S. revenue in 2020, representing just [REDACTED]% of Sirius XM’s total revenue.<sup>89</sup> That \$ [REDACTED] million figure also represented only [REDACTED]% of the revenues Sirius XM attributed to Pandora for the year (\$1.70 billion), with the remainder generated from advertising on Pandora’s ad-supported service.<sup>90</sup>

52. Like Spotify, Sirius XM has also recently been investing in podcasting, and is investigating growing the podcast side of the business for both Pandora and the Sirius XM digital platform.<sup>91</sup> Pandora described its addition of podcasts back in 2017 as “the first natural step” in

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<sup>87</sup> **COEX-8.61** – Sirius XM 2019 Q1 Earnings Call, at 12. *See also* **COEX-8.63** – Alex Eule, “Sirius XM’s Deal to Buy Pandora Is a Win for Legacy Media,” *Barron’s*, Sept. 25, 2018, <https://www.barrons.com/articles/sirius-xm-pandora-deal-1537836262> (“Sirius sees opportunity for cross-promotion between its 36 million paying subscribers and Pandora’s 70 million active listeners. The bulk of Pandora’s users are non-paying customers, but the company does have about six million paying subscribers. Sirius can now try to sell its subscription package into Pandora’s large user base.”).

<sup>88</sup> **COEX-8.61** – Sirius XM 2019 Q1 Earnings Call, at 13 (“One other thing just on the Pandora to Sirius path, just one example, but you can multiply this into the thousands or ten thousands. Someone listening or feeds a Garth Brooks channel for instance on Pandora. That is clearly someone who has an affinity to Garth. Right now, there is in-terstitials and other things playing on Pandora that -- whether they’re 30 seconds or a minute before different song that highlights that there is a Garth Brooks Channel on SiriusXM.”). *See also* **COEX-8.64** – Sirius XM Announces Merger Agreement with Pandora – Investor Deck Sirius XM (Sept. 24, 2018) at 9 (illustrating how Sirius XM’s acquisition of Pandora creates a “compelling ecosystem” in which Pandora “Ups-Sells” to Sirius XM).

<sup>89</sup> *See* Eisenach WDT, Appendix C.

<sup>90</sup> **COEX-8.32** – Sirius XM 2020 Annual Report at 36. Specifically, of the revenue attributed to Pandora, \$1.2 billion was advertising revenue and \$515 million subscription revenue, underscoring just how much of Pandora’s total revenue is reliant on ad revenue.

<sup>91</sup> Sean Sullivan, Exec VP & CFO said at a Credit Suisse conference June 15, 2021: “And as you know, we’re starting to bring certain podcasts to Pandora and even into the SiriusXM digital platform. So I think we’re focused on



its broader “intention to expand beyond music.”<sup>92</sup> Sirius XM acquired Stitcher, a podcast listening platform, from The E.W. Scripps Company for total consideration of \$296 million in a deal that closed in October 2020<sup>93</sup> It now offers a paid podcasting service, Stitcher Premium, for \$4.99/month or \$34.99/year.<sup>94</sup> Sirius XM also acquired Simplecast in June 2020 for \$28 million in cash<sup>95</sup> for its podcast distribution and analytical tools, and a minority stake in Soundcloud for \$75 million, a deal announced in February 2020.<sup>96</sup> Sirius stated in its Q2 2021 10-Q that “The acquisition of Stitcher, in conjunction with Simplecast, created a full-service platform for podcast creators, publishers and advertisers.”<sup>97</sup>

53. Pandora has been diversifying its revenue streams through new advertising partnership and acquisitions as well. In 2018, it and SoundCloud announced a partnership under which advertisers could purchase advertising inventory on the SoundCloud platform through Pandora.<sup>98</sup> According to Pandora, under this partnership, SoundCloud would “use Pandora as its

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distribution of podcast, monetization of podcast.” **COEX-8.68** – Sean Sullivan, “Sirius XM Holdings Inc.’s (SIRI) Management Presents at Credit Suisse 23rd Annual Communications Conference,” Seeking Alpha (Jun. 15, 2021) <https://seekingalpha.com/article/4434995-sirius-xm-holdings-inc-s-siri-management-presents-credit-suisse-23rd-annual-communications>.

<sup>92</sup> **COEX-8.61** – Pandora 2017 Q4 Earnings Call at 5.

<sup>93</sup> Sirius, in its 2020 10-K, stated that it “acquired the assets of Stitcher and certain of its subsidiaries for a total consideration of \$296 million, which includes \$272 million in cash and \$30 million related to contingent consideration, partially offset by working capital adjustments of \$6 million.” **COEX-8.32** – Sirius XM 2020 Annual Report at 35.

<sup>94</sup> **COEX-8.69** – Stitcher Premium, Stitcher, <https://www.stitcher.com/premium>.

<sup>95</sup> **COEX-8.32** – Sirius XM 2020 Annual Report at 35.

<sup>96</sup> **COEX-8.32** – Sirius XM 2020 Q2 Financial Report at 11.

<sup>97</sup> **COEX-8.32** – Sirius XM 2021 Q2 Financial Report at 11. The \$302 million price for Stitcher is prior to \$49 million in “additional payments to Scripps related to the contingent consideration based on Stitcher’s 2020 results and its achievement of certain financial metrics in 2021.” *Id.*, at 13.

<sup>98</sup> **COEX-8.67** – Pandora 2018 Q3 Press Release at 3; *see also* **COEX-8.70** – SoundCloud Selects Pandora as Ad Sales Partner in the U.S., SoundCloud (Oct. 3, 2018) <https://press.soundcloud.com/168977-soundcloud-selects-pandora-as-ad-sales-partner-in-the-u-s>.

exclusive U.S. advertising and sales representation” and would also rely on the programmatic audio platform, AdsWizz, that Pandora acquired earlier the same year.<sup>99</sup>

**V. Music streaming is underpriced and used to generate revenues in larger, more valuable business lines**

54. The Services are not seeking to maximize the present profitability of their interactive music streaming offerings on a standalone basis, because they realize greater value by using their music offerings to increase their customer base and to use that increased customer base to promote sales of complementary services and products.

**A. The Services are seeking to maximize overall profits across all their business lines, not their music streaming offerings’ profits standing alone**

55. For-profit firms seek to maximize their enterprise-wide profits. The Services are no different. In assessing the success of a particular business line, a company and its investors do not focus on the business line’s profits or losses in a vacuum or in individual silos, but will look at those profits and losses in the context of what the business line’s contributions are to the company’s overall value versus its costs.<sup>100</sup>

56. The Services can lose money in terms of the costs and revenues attributed to their music products while reaping a net positive impact – realizing enormous overall profits – from those offerings due to their impact on the Services’ other business lines and share value. The Services are well aware of this fact and are acting in a commercially rational manner when they

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<sup>99</sup> **COEX-8.67** – Pandora 2018 Q3 Press Release at 3; *see also* **COEX-8.70** – SoundCloud Selects Pandora as Ad Sales Partner in the U.S., SoundCloud (Oct. 3, 2018) <https://press.soundcloud.com/168977-soundcloud-selects-pandora-as-ad-sales-partner-in-the-u-s>. *See also* **COEX-8.67** – Pandora 2018 Q1 Press Release at 2 (describing acquisition of AdsWizz).

<sup>100</sup> **COEX-8.71** – Testimony of Dr. Leslie Marx in *In re Petition of Pandora Media, Inc.*, 12 CV 8035 (DLC), 41 CV 1395 (DLC), at 873:22-874:4 (“ . . . [W]hen you have complementary products, if you’re going to maximize your profits overall, you wouldn’t be maximizing the revenue streams on each individual one. That’s the nature of having complementary revenue streams.”).

operate interactive music streaming platforms that, on paper, might appear to be running at an accounting loss.<sup>101</sup> The Services are all for-profit entities and would not continue to operate any business unit year after year, as they have with interactive music streaming, if they did not conclude that the business unit was serving one or more important functions for their overall enterprise.<sup>102</sup>

57. The previous Phonorecords proceeding and testimony from Copyright Owners' expert Dr. Rysman established that there is a range of non-exhaustive reasons why a firm may act in a way that maximized market share over other goals such as profitability.<sup>103</sup> Given the increased subscriber base, market cap and revenue of the leading streaming services, these elements are even more true today than they were in the previous proceeding. These elements, which are discussed in further detail later in this Report, include:

- Network effects: Network effects elements create a benefit from gaining additional subscribers that is not tied to current profitability, but can lead firms to forego current profitability for other goals tied to growing users. These rationales are rooted in the goals of realizing greater long-term revenue or value for the music service or greater profitability and value from other

<sup>101</sup>

(COEX-8.161 – , AMZN\_PHONOIV-00000001).

(COEX-8.185 -

, GOOG-PHONOIV-00002444).

<sup>102</sup> The big tech Services, for example, have had no issue shuttering their poorly performing endeavors in the past, such as the Google+ social network . See Ben Smith, “Project Strobe: Protecting your data, improving our third-party APIs, and sunseting consumer Google+” (Oct. 8, 2016) <https://blog.google/technology/safety-security/project-strobe/>. Yet each of them has stayed firmly in the interactive music streaming market despite accounting losses, showing that music is serving their larger strategic goals and generating value for their businesses in other ways.

<sup>103</sup> *Phonorecords III*, Written Direct Testimony of Marc Rysman.

business lines that benefit from the music service and the customers acquired through the music service.<sup>104</sup>

- Growth is a primary focus: As described in this report, the major services are prepared to incur losses, keep pricing artificially low, and market their services at levels that are disproportionate to the revenue generated in order to realize the highest possible growth and market share, thereby acquiring consumers (and information about those consumers) for their other businesses. Spotify has been focused on growth for years, following the lead of investors. Spotify's then-CFO Barry McCarthy admitted in the previous proceeding<sup>105</sup> [REDACTED]

[REDACTED], and public statements by CEO Daniel Ek have reiterated that same strategy.

- Building user data and access to consumers: The major interactive music streaming services are able to collect information on users that can be then leveraged to better tailor the music service to that user as well as to better target advertising to those consumers, both for other services

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<sup>104</sup> Direct (within-market) network effects, according to the LSE Media Project, reflect the fact that, “[t]he value of a communications network increases disproportionately as it expands, bringing in more other people for each user to connect with – a ‘direct’ network effect.” Patrick Barwise, “Why tech markets are winner-take-all” (June 16, 2018) <https://blogs.lse.ac.uk/businessreview/2018/06/16/why-tech-markets-are-winner-take-all/>. This is important for social media aspects of music streaming networks, and for actions such as sharing playlists or using the playlists of well-known people. Indirect (cross-market) network effects also exist. These exist because “most tech companies are, at least to a degree, ‘platform’ businesses: they create value by matching customers with complementary needs, such as software developers and users (Microsoft’s MS-DOS and Apple’s App Store) or advertisers and consumers (Google and Facebook). These network effects are ‘indirect’ because the value to participants in each market (e.g. diners) depends on the number of participants in the *other* market (e.g. restaurants) and *vice versa*. Once a platform dominates both markets, indirect network effects become self-sustaining as users on each side help generate users on the other.” These elements also exist in a music streaming platform, matching artists and music listeners. This article further states: “To succeed, new platform businesses need to achieve critical mass in both or all the key markets simultaneously. The failure rate is high: platform start-ups have to sustain many loss-making years and many never achieve profitability as standalone businesses.” *Id.*

<sup>105</sup> *Phonorecords III* Hearing Transcript, 2081:13 – 2083:3 (McCarthy).

and products in the service’s ecosystem and to the service’s advertiser base. Apple states, for example, that “Apple collects information about your Apple Music activity, such as the songs you play and how long you play them, to personalize the service when you are subscribed, send you notifications, and compensate our partners.”<sup>106</sup> Gathering this kind of user data can help streaming services to keep subscribers within their ecosystem and reduce churn. It can also be used to better match advertisers with their target demographic.

58. The Services have been candid that they are not seeking or expecting to have their music streaming offerings be profit centers for their overall enterprises but that, rather, such offerings serve greater overall strategic purposes.

59. Apple’s CEO has acknowledged that Apple is not involved in music services “for the money,” suggesting that Apple is offering the streaming service due to the broader benefits that a music service conveys, such as getting people into its ecosystem.<sup>107</sup>

60. Google admitted in the previous proceeding that the Google Play Music service [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED].<sup>108</sup> That is because the music service making losses is

<sup>106</sup> **COEX-8.72** – Apple Music & Privacy, Apple, <https://support.apple.com/en-us/HT204881>. Apple further states “When you subscribe, Apple collects information about how you use Apple Music in order to tailor features to your musical tastes. These features include Listen Now, where you see albums and playlists picked for you, and Radio, which plays selections from your favorite artists and genres. We also use this information so that we can contact you by email and push notification about upcoming releases, new artists, and other happenings on Apple Music that you may like.”

<sup>107</sup> **COEX-8.74** – Luke Dormehl, “Tim Cook: We’re not doing Apple Music for the money” (Aug. 8, 2018) <https://www.cultofmac.com/568547/tim-cook-were-not-doing-apple-music-for-the-money/>. As this article observes, Apple “can use Apple Music to get more people into the Apple ecosystem, and provide extra incentive for them to stay. With so much cash on hand, Apple can basically afford to play a war of attrition in this arena, and others simply aren’t going to be able to compete long-term since they’re required to, well, actually turn a profit.”

<sup>108</sup> *Phonorecords III*, Hearing Testimony, at Tr. 788:5-793:7 (Joyce).

acceptable to grow market share and subscribers and support other lines of business. [REDACTED]

[REDACTED]

[REDACTED]<sup>109</sup>

[REDACTED]

[REDACTED]<sup>110</sup> [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]<sup>111</sup>

61. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]<sup>112</sup> [REDACTED]

[REDACTED]

[REDACTED]<sup>113</sup> [REDACTED]

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<sup>109</sup> **COEX-8.76** – [REDACTED] (June 2, 2016) (*Phonorecords III* hearing exhibit 3212) at GOOG-PHONOIII-00005543.

<sup>110</sup> *Id.* at 6.

<sup>111</sup> *Id.*, at 37. [REDACTED]

<sup>112</sup> **COEX-8.77** – [REDACTED] (June 28, 2016) (*Phonorecords III* hearing exhibit 3209) at GOOG-PHONOIII-00003903.

<sup>113</sup> *Id.* at 18, 20. *See also* **COEX-8.14** – [REDACTED] (*Phonorecords III* hearing exhibit 546) at GOOG-PHONOIII-00002858 ([REDACTED]).

[REDACTED]

[REDACTED]<sup>114</sup>

62. About its big tech competitors' strategies, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]<sup>115</sup> [REDACTED]

[REDACTED]

[REDACTED]<sup>116</sup> [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

63. Spotify offered testimony in the last Phonorecords proceeding that its Big Tech competitors [REDACTED]

[REDACTED]

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<sup>114</sup> COEX-8.78 – [REDACTED] (*Phonorecords III* hearing exhibit 2704) at GOOG-PHONOIII-00070900.

<sup>115</sup> COEX-8.76 – [REDACTED] (June 28, 2016) (*Phonorecords III* hearing exhibit 3209) at GOOG-PHONOIII-00005546.

<sup>116</sup> *Id.*

[REDACTED]<sup>117</sup> One of Spotify’s witnesses made a similar observation of Apple, noting that “[REDACTED]

Apple is pursuing generous offers based on Apple Music, giving away six month free trials to new subscribers who purchase AirPods or Beats,<sup>119</sup> or collaborating with Best Buy to offer six months of free Apple Music to those with a Best Buy account with an eligible purchase of Apple-related merchandise that can be as cheap as \$2.99 for a discounted iPhone case.<sup>120</sup>

[REDACTED] 121 [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED] 122

64. The dynamics listed above establish why looking at the economics of music streaming products in isolation understates the profits that the music generates for the largest companies that offer these services. In addition, there are concerns that once subscribers have

<sup>117</sup> *Phonorecords III*, McCarthy Written Direct Testimony ¶¶ 50-51.

<sup>118</sup> *Phonorecords III*, Page Written Direct Testimony ¶ 58. Industry observers have taken note of the fact that the Services are not seeking present accounting profitability directly from their interactive streaming offerings but are using music as part of a broader strategy. MIDIA Research has observed that the major streaming services “use[] music as a means to achieve ulterior strategic objectives.” **COEX-8.79** – Mark Mulligan, “Economics of Music Streaming Inquiry,” MIDiA Research (November 2020) at 3.

<sup>119</sup> **COEX-8.21** – “Get Apple Music free for 6 months” <https://offers.applemusic.apple/six-month-offer>.

<sup>120</sup> **COEX-8.22** – “Enjoy 6 free months of Apple Music when you purchase select products” <https://www.bestbuy.com/site/promo/apple-music-offer?sp=%2Bcurrentprice%20skuidsaa>.

<sup>121</sup> **COEX-8.48** – [REDACTED]” at SPOTCRB0011612 (*Phonorecords III* hearing exhibit 2705).

<sup>122</sup> *Webcasting V*, SoundExchange Ex. 064, at SXWEBV 00004549.



grown to an acceptable level of critical mass and market share has been optimized, that the larger, diversified players in this market may then engage in further discounting or bundling to maintain and grow their advantage, due to the fact that revenues and profits can be delivered by other business lines.<sup>123</sup>

**B. The Big Tech Services’ complementary business lines dwarf their music streaming products and drive their business models**

65. For the Big Tech Services, which [REDACTED], complementary business lines are many multiples larger than the music streaming products, which are used to provide support for those business lines. As discussed in Section IV.B, U.S. interactive music streaming revenues represent [REDACTED] of Amazon’s, Apple’s and Alphabet’s revenues in the aggregate, and, as discussed throughout this report, the Services are not seeking to maximize their music offerings’ profitability (and have acknowledged this is the case) but are instead using music and the customer base attracted by the music to drive revenue elsewhere in their ecosystems and thereby maximize the value of their enterprises overall. In this Section, I provide further analysis of the relationship between music and complementary business lines for the big tech Services and of the magnitude of these firms’ complementary offerings.

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<sup>123</sup> The U.K. Parliamentary Report from July 2021, for example, stated: “There is a risk, however, that the current unprofitability of music streaming may lead companies to adopt increasingly anti-competitive practices in order to become (more) profitable. This may lead to a market ‘tipping’, whereby once a product or service reaches a critical mass of users, network effects create a snowball effect whereby a market rapidly tends towards monopoly equilibrium. Vertically integrated tech companies, for example, with more mature hardware and smart technology divisions could theoretically gain an advantage by creating incentives such as free trials or frictions for competitors such as denying access to third-party services or shipping with defaults that are difficult for customers to change, particularly if one piece of hardware were to dominate the market.” **COEX-8.80** – Digital, Culture, Media and Sport Committee, “Economics of music streaming,” UK Parliament House of Commons (July 15, 2021) at 81.

i. Apple

66. A majority of Apple's revenue comes from hardware. It earned 80% of its revenue from selling iPhones, Macs, iPads and wearables (50% from iPhones alone) in its fiscal year ended September 26, 2020.<sup>124</sup> In its latest quarter (the three months ended June 26, 2021) the company grew its net sales by double digits in each of its product categories, with June quarter records for iPhone, Mac and Wearables, Home and Accessories.<sup>125</sup>

67. Although Apple makes most of its revenues from hardware, it is not merely a product company but an [REDACTED]

[REDACTED]

[REDACTED]<sup>126</sup>

68. Apple Music has long played an important role in this dynamic, helping to attract and retain customers within Apple's ecosystem. Smart phones are known as the most popular way to stream music, making music an important element of Apple's platform. Not only does music support the larger bundled offering, it also supports hardware sales of iPhones as well as other Apple products, such as the HomePod, Beats headphones and AirPods. The fact that devices such as the iPhone, the Apple Watch, AirPods and the HomePod are designed to work seamlessly together is a powerful factor in keeping consumers in Apple's ecosystem. As industry observers have recognized, tying its music offering together with its devices in these ways is part of Apple's

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<sup>124</sup> **COEX-8.36** – Apple 2020 Annual Report at 21.

<sup>125</sup> **COEX-8.81** – Apple 2021 Q3 Earnings Call, at 6.

<sup>126</sup> **COEX-8.82** – Jim Kelleher, Argus Research, Apple Inc. Analyst notes, July 28, 2021, at 2-4.

business strategy to “keep customers captive in the Apple ecosystem,” specifically, by purchasing more and more Apple hardware.<sup>127</sup>

69. Apple’s revenues from its iPhone devices have recently experienced strong growth. iPhones generated revenue of \$39.6 billion in fiscal Q3 (calendar Q2), representing 49% of Apple’s total revenue. This result was a record for any fiscal Q3 and an increase of 50% year-over-year, not to mention a turn-around for the segment.<sup>128</sup> iPhone revenues had experienced weakness in 2019 and 2020 (down 14% and 3% respectively) and Apple was known to be looking elsewhere for growth. Much of the revenue growth in those years came from its “Wearables, Home and Accessories”<sup>129</sup> and “Services”<sup>130</sup> segments. The Wearables revenue line reached \$30.6 billion in 2020, and the Services revenue line reached \$53.8 billion in 2020.<sup>131</sup> Together, these segments combined went from \$57.1 billion in revenue in 2018 to \$84.4 billion in 2020, creating a large revenue stream and substantial source of growth for Apple.

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<sup>127</sup> “For example, iPhone users can ask Siri to stream specific songs and playlists from Apple Music to any of their Apple devices. And AirPods, the dorky new Bluetooth headphones, get the same connectivity smarts. They work magically with everything in the Apple ecosystem as soon as you open their carrying case. It’s not really magic. It’s by design. It’s a trap to keep customers captive in the Apple ecosystem. And it’s working.” **COEX-8.84** – Jon Markman, “Apple Grows Its Ecosystem, And Its Advantage,” *Forbes* (Apr. 12, 2017) <https://www.forbes.com/sites/jonmarkman/2017/04/12/apple-grows-its-ecosystem-and-its-advantage/>. [REDACTED]

[REDACTED] *Webcasting V*, SoundExchange Ex. 6 at PANWEBV\_00004565.

<sup>128</sup> **COEX-8.36** – Apple 2021 Q3 Financial Report at 24.

<sup>129</sup> This segment includes sales of AirPods, Apple TV, Apple Watch, Beats products, HomePod, iPod touch and Apple-branded and third-party accessories. **COEX-8.36** – Apple’s 2020 Annual Report at 1, 21.

<sup>130</sup> According to Apple’s 2020 10-K report, Services net sales “include sales from the Company’s advertising, AppleCare, digital content and other services. Services net sales also include amortization of the deferred value of Maps, Siri, and free iCloud storage and Apple TV+ services, which are bundled in the sales price of certain products,” **COEX-8.36** – Apple 2020 Annual Report at 21.

<sup>131</sup> *Id.*

70. U.S. revenues comprised 39.8% of Apple’s revenues in 2020.<sup>132</sup> Apple does not break out U.S. revenue for its revenue categories, but applying this percentage to the global revenues indicates that its individual revenue categories are each generating many billions of dollars of revenue for Apple.

71. As is evident, Apple’s iPhone product market is at the core of its ecosystem, and driving sales of iPhones remains the heart of Apple’s revenue base. Apple’s “Wearables” revenue segment has also seen large growth, from \$17.4 billion in revenue in 2018 to \$30.6 billion in 2020, a growth rate of 76%.<sup>133</sup> Apple’s CFO & Sr. VP Luca Maestri observed in the Q2 2020 earnings call that the wearables segment “is now the size of a Fortune 140 company,” saying:

Our Wearables business is now the size of a Fortune 140 company, and we’re very excited by the many opportunities in front of us for this product category. For example, Apple Watch continues to extend its reach at over 75% of the customers purchasing Apple Watch around the world during the quarter were new to the product.<sup>134</sup>

The wearables segment is projected to grow further to \$ [REDACTED] in fiscal 2021 and \$ [REDACTED] by 2022.<sup>135</sup> That revenue figure would put it higher than either United Airlines’ or American Airlines’ total 2019 (pre-Pandemic) revenue bases.<sup>136</sup>

72. AirPods<sup>137</sup> sales have been a major source of strength in the wearables segments,

[REDACTED] <sup>138</sup>

<sup>132</sup> **COEX-8.36** – Apple 2020 Annual Report at 56.

<sup>133</sup> **COEX-8.36** – Apple 2020 Annual Report at 21.

<sup>134</sup> **COEX-8.81** – Apple 2020 Q2 Earnings Call at 7-8.

<sup>135</sup> **COEX-8.26** – Apple Inc., “Material rev/EPS upside despite supply chain headwinds driven by across the board strength,” UBS Securities, at 4.

<sup>136</sup> **COEX-8.179** – Fortune 500 List (2019) <https://fortune.com/fortune500/2019/search/>.

<sup>137</sup> AirPods are wireless blue tooth earbuds designed to work seamlessly with Apple products such as the iPhone and iPad. Apple’s AirPods first became available in December 2016.

<sup>138</sup> **COEX-8.89** – Wearable Tech: Hearables on a rampage, Mike Paxton, S&P Global Market Intelligence (Kagan),

Apple has created a major new revenue source as AirPods have taken off, growing to an installed base globally of over [REDACTED] as of calendar Q2 2021,<sup>139</sup> with plenty of growth still to come.<sup>140</sup> AirPods have become a major new hardware category (“smart wireless earphones”) that could grow to a category with [REDACTED], with many new applications and uses.<sup>141</sup> For Apple, this category is huge.

73. AirPods have been called “the fastest growing segment of the world’s most valuable company.”<sup>142</sup> Not only do they keep people in the Apple ecosystem, but AirPods are a major revenue generator. While Apple does not break out AirPods revenue, those revenues were likely over [REDACTED]<sup>143</sup> globally in Apple’s fiscal 2020, of which \$ [REDACTED] could be allocated to the U.S. at Apple’s overall U.S. percentage of revenue in fiscal 2020.

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August 3, 2020.

<sup>139</sup> **COEX-8.87** – Milan Alexis Ringol, et al., “Recent releases support continued growth of Apple product shipments in Q2’21,” S&P Global Market Intelligence (Kagan), August 9, 2021. See Excel attachment supporting the report (“Worldwide Apple connected devices historical shipments and running installed base.”).

<sup>140</sup> Together with the vastly increased utility of AirPods versus wired headphones, Apple announced it would stop including wired headphones with its iPhones in an October 2020 event, noting at the time that “customers already have over 700 million Lightning headphones.” Devin Coldewy, iPhones Won’t Come With Headphones or Power Adapters in the Box From Now On, TechCrunch (Oct. 13, 2020) <https://techcrunch.com/2020/10/13/iphones-wont-come-with-headphones-or-power-adapters-in-the-box-from-now-on/>. Apple had already done away with the wired headphone jack in its iPhones, starting with the iPhone 7 model.

<sup>141</sup> **COEX-8.90** – “Smart wireless earphones: the next device to reach annual sales of 1bn units?,” UBS Global Research, June 30, 2021, at 1. [REDACTED]

<sup>142</sup> **COEX-8.91** – Kevin Rooke, AirPods, “Accessory or the Next Big Thing,” KevinRooke.com (May 15, 2020) <https://www.kevinrooke.com/post/apple-airpods-iphone-accessory-or-the-next-big-thing>.

<sup>143</sup> This revenue estimate is derived from multiplying the [REDACTED] AirPod sales figure in Apple’s fiscal 2020 from Kagan data (see **COEX-8.87** – Excel attachment, “Worldwide Apple connected devices historical shipments and running installed base”) by the average wearables unit sales price in the U.S. in that period from Kagan data (\$ [REDACTED]). **COEX-8.89** – Wearable Tech: Hearables on a rampage, Mike Paxton, S&P Global Market Intelligence (Kagan), August 3, 2020 (see Excel attachment, “Hearable device forecast through 2024”). **COEX-8.92** – Jesse Pound, “AirPods were a \$6 billion business for Apple this year and will be even bigger next year, top analyst says,” CNBC (Dec. 20, 2019) <https://www.cnbc.com/2019/12/20/airpods-a-6-billion-business-for-apple-will-be-bigger-next-year.html>. The CNBC article notes that Bernstein analysts estimated a \$15 billion revenue total for Apple’s AirPods segment in 2020.

74. Given Apple's major share of the overall category, and the projection that the overall market could grow from \$[REDACTED] in 2020 to \$[REDACTED] in 2025,<sup>144</sup> it is clear that AirPods are a major revenue category for Apple that will be worth tens of billions of dollars in revenue and billions in profits at Apple's profit margins.

75. The "Wearables, Home & Accessories" segment also includes Apple Watches, HomePods, Apple TV devices and Beats products. HomePod, a device made to listen to music,<sup>145</sup> had unit sales of over [REDACTED] devices globally in Apple's fiscal 2020,<sup>146</sup> yielding likely over \$[REDACTED] of revenue for Apple in the U.S. in 2020 at Apple's overall U.S. percentage of revenue.<sup>147</sup> People also listen to music on their Apple Watches, a category for Apple that saw global device sales of over [REDACTED]<sup>148</sup> in Apple's fiscal 2020 and [REDACTED] of revenue (possibly close to \$[REDACTED] of U.S. revenue for Apple in fiscal 2020).<sup>149</sup> There were close to [REDACTED] Apple TV streaming media player units shipped in fiscal 2020<sup>150</sup> for estimated revenues

<sup>144</sup> **COEX-8.90** – "Smart wireless earphones: the next device to reach annual sales of 1bn units?," UBS Global Research, June 30, 2021, at 5.

<sup>145</sup> **COEX-8.94** – "The speakers of the house," Apple <https://www.apple.com/homepod/>.

<sup>146</sup> **COEX-8.87** – "Recent releases support continued growth of Apple product shipments in Q2'21," S&P Global Market Intelligence (Kagan), August 9, 2021 (*see* Excel attachment, "Worldwide Apple connected devices historical shipments and running installed base.").

<sup>147</sup> In 2020, Apple sold its original HomePod for most of the year, but introduced the HomePod Mini in November 2020. This revenue estimate is derived from multiplying HomePod sales ([REDACTED]) by the retail price of \$299. **COEX-8.30** – "Apple iPhone shipments break record in Q4'20 as 5G goes Mainstream, S&P Global Market Intelligence (Kagan), February 4, 2021. HomePod unit sales are from "Worldwide Apple connected devices historical shipments and running installed base."

<sup>148</sup> **COEX-8.87** – "Recent releases support continued growth of Apple product shipments in Q2'21," S&P Global Market Intelligence (Kagan), August 9, 2021 (*see* Excel attachment, "Worldwide Apple connected devices historical shipments and running installed base.").

<sup>149</sup> Kagan has estimated that average selling price for a smartwatch for the U.S. in 2020 was \$[REDACTED]. **COEX-8.95** – Mike Paxton, "Wearable tech: Apple continues to rule smartwatch market," S&P Global Market Intelligence (Kagan), July 16, 2020 (*see* Excel attachment, "Global smartwatch forecast through 2024.").

<sup>150</sup> **COEX-8.87** – Milan Alexis Ringol, et al., "Recent releases support continued growth of Apple product shipments in Q2'21," S&P Global Market Intelligence (Kagan), August 9, 2021 (*see* Excel attachment, "Worldwide Apple connected devices historical shipments and running installed base.").

of over \$[REDACTED] globally and [REDACTED] of dollars in potential revenue for Apple in the U.S.<sup>151</sup> Beats Electronics, which Apple bought for \$3.2 billion in May 2014, is said to be generating upwards of \$1 billion in revenue a year.<sup>152</sup> Altogether, the Wearables, Home & Accessories segment, Apple's fastest growing, generated over \$12 billion a year in fiscal 2020 in the U.S. (assuming Apple's overall contribution of 40% revenue from the U.S.). If AirPods were to represent \$4.2 billion of this U.S. revenue, that still leaves \$8 billion of revenue generated by the other components of the wearables segment. This segment is still growing strong and could exceed [REDACTED] in U.S. revenue by fiscal 2022.<sup>153</sup>

ii. Google

76. Google makes the vast majority of its revenue from advertising. It generated over 80% of its revenue from the display of ads online in 2020.<sup>154</sup> Revenue from YouTube ads grew from \$15.1 billion in 2019 to \$19.8 billion in 2020.<sup>155</sup>

77. Google also makes substantial revenue from its Android mobile operating system. As noted in Section VA, [REDACTED]

[REDACTED] Google does not disclose the revenue attributable to Android, but using historical data it is possible to extrapolate an idea of what Android could be worth to Google closer to the present

<sup>151</sup> **COEX-8.29** – “Apple Q1’21 product shipments shot up YOY across nearly all segments,” Kagan, May 11, 2021. The article cited unit pricing for Apple TV HD at \$149.

<sup>152</sup> **COEX-8.93** – Adam Fawaz, “Why did Apple buy Beats for 3.2 Billion,” Mac O’Clock (Jul. 28, 2020) <https://medium.com/macoclock/why-did-apple-buy-beats-for-3-2-billion-92d3a5cab764>.

<sup>153</sup> **COEX-8.26** – “Apple Inc., Material rev/EPS upside despite supply chain headwinds driven by across the board strength,” UBS, July 28, 2021.

<sup>154</sup> **COEX-8.37** – Alphabet 2020 Annual Report at 66.

<sup>155</sup> *Id.*

day. A figure disclosed in January 2016 as part of a lawsuit from Oracle indicated that Google had made \$31 billion in revenue and \$22 billion in profit since its release in 2008.<sup>156</sup> Of course, Google's revenues have increased significantly since that time – from an average \$44.4 billion in the years 2008 through 2015 to \$182.5 billion in 2020. As an illustrative exercise, proportionate to Google's 2020 revenues, the per-year figure of \$4.3 billion a year<sup>157</sup> would be closer to \$17.6 billion/year today, and likely higher given the much larger installed base of Android devices<sup>158</sup> and the size of Google's mobile search revenues.

78. Google makes money and derives value from Android via such areas as its Google Play store, and apps such as Google Maps. One estimate puts the value generated by Android for Google at \$18.8 billion in 2019.<sup>159</sup>

79. Android has a higher market share than Apple's iOS globally, and also in the U.S., where it held a [REDACTED] as of December 2020.<sup>160</sup> Alphabet has disclosed that it derived 47% of its revenues from the U.S. in 2020.<sup>161</sup> Applying this U.S. percentage to the estimated Android revenue number of \$17.6 billion arrived at as described above would indicate over \$8 billion of revenue potentially attributable to Android in the U.S. in 2020.

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<sup>156</sup> **COEX-8.96** – Steve Trousdale, Oracle Lawyer Says Google's Android Generated \$31 Billion Revenue, Reuters (Jan. 01, 2016) <https://www.reuters.com/article/us-oracle-google-lawsuit/oracle-lawyer-says-googles-android-generated-31-billion-revenue-idUSKCN0UZ2W9>.

<sup>157</sup> This \$4.3 billion figure is derived from dividing the reported \$31 billion in revenue by 7.25 years. Android launched in late September 2008; yielding a period of 7.25 years between Q4 2008 – 2015.

<sup>158</sup> **COEX-8.97** – Frederic Lardinois, "Android now powers 2.5B devices," Tech Crunch (May 7, 2019) <https://techcrunch.com/2019/05/07/android-now-has-2-5b-users/>.

<sup>159</sup> **COEX-8.98** – Kamil Franek, "How Google Makes Money from Android Business Model Explained," Kamilfranek.com (Jan. 14, 2020) <https://www.kamilfranek.com/how-google-makes-money-from-android/>. This value estimate includes cost savings from Android in mobile search applications.

<sup>160</sup> **COEX-8.99** – John Fletcher, "US mobile projections through 2030," Kagan, June 3, 2020.

<sup>161</sup> **COEX-8.37** – Alphabet 2020 Annual Report at 66.



80. Google's revenues from Google Play includes sales of apps and in-app purchases. Google accounts for this revenue stream in its "Google Other" category, which totalled \$21.7 billion in 2020. This is also where Google accounts for hardware sales, including Google Nest home products, Pixelbooks, and other devices; and YouTube non-advertising revenues, including YouTube Premium and YouTube TV subscriptions. At the overall Google U.S. share of revenues of 46.6%, the U.S. revenues for this revenue category would be \$10.1 billion in 2020.

81. The U.S. revenue for Google's overall ad business is much higher. Alphabet disclosed it derived over 80% of its revenues from the display of ads online in 2020,<sup>162</sup> which would indicate over \$146.0 billion of ad revenue, versus Alphabet's total revenue of \$182.5 billion. Applying the U.S. share of 47% indicates potential U.S. advertising revenue in 2020 of \$68.6 billion.

82. Advertising revenue is related to music revenue, as Google is able to learn about the users brought into its ecosystem through their music use and search histories in general. While Google and Apple have said they will stop using cross-website tracking information on consumers to target advertising due to privacy concerns, Google says it will still use "first-party" data when targeting ads that will appear on its own web sites. This includes data from its own services, including YouTube and users' Google search histories. Google can benefit from the trend against using cross-website tracking because it collects such a vast amount of its own data, including users' browsing histories on their devices.<sup>163</sup>

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<sup>162</sup> **COEX-8.37** – Alphabet 2020 Annual Report at 66.

<sup>163</sup> **COEX-8.102** – Sam Schechner and Keach Hagey, "Google to Stop Selling Ads Based on Your Specific Web Browsing," The Wall Street Journal (Mar. 3, 2021) <https://www.wsj.com/articles/google-to-stop-selling-ads-based-on-your-specific-web-browsing-11614780021> "Citing privacy concerns, Google says it won't use technologies that track individuals across multiple websites."

83. This complementary revenue for Google totalled \$78.5 billion in 2020 for the U.S. (including advertising and Google other revenue).

iii. Amazon

84. For Amazon, music is a way to convert customers to Amazon Prime, retain existing Amazon Prime customers, and increase Prime customers' engagement,<sup>164</sup> and it also helps Amazon sell devices such as Echo smart speakers.

85. Amazon Prime members spend more on Amazon than its non-Prime member customers. As Jeff Bezos stated in 2016, “[I]f you look at Prime members, they buy more on Amazon than non-Prime members, and one of the reasons they do that is once they pay their annual fee, they’re looking around to see, ‘How can I get more value out of the program?’ And so they look across more categories — they shop more.”<sup>165</sup> Amazon’s former CFO has stated the same, explaining on an earnings call that “certainly Prime customers buy more than non-Prime customers.”<sup>166</sup> [REDACTED]

[REDACTED]<sup>167</sup>

86. [REDACTED]

<sup>164</sup> See e.g., *Phonorecords III*, Hearing Transcript, Tr. 1465:10-1467:2 (Mirchandani) (explaining that Amazon sees Prime Music as a way to “increase engagement, retention, and also conversion” with the Prime service).

<sup>165</sup> **COEX-8.103** – Nathan McAlone, Here's why Amazon's new music ambitions should scare Apple and Spotify, Insider (Sep. 27, 2016) <https://www.insider.com/amazons-new-music-service-should-scare-apple-and-spotify-2016-9>. The article quoting Mr. Bezos goes on to note Amazon's ability to use music to drive revenues in complementary product lines: “Amazon can use TV shows and music to help it sell more shoes, Echo speakers, or Prime subscriptions. Bezos doesn't have to sweat the margins in the same way as competitors like Spotify or Netflix, whose entire business is built around a single offering.”

<sup>166</sup> **COEX-8.137** – Amazon 2014 Q2 Earnings Call at 13.

<sup>167</sup> **COEX-8.104** – [REDACTED] (*Phonorecords III* hearing exhibit 3007) AMZN00053862. See also, *Phonorecords III*, Hearing Transcript, Tr. 1471:23-1472:25 (Mirchandani).

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]<sup>168</sup> It is clear that the music offering has directly increased revenues for Amazon in its Prime revenue line, [REDACTED]

[REDACTED]

[REDACTED].<sup>169</sup>

87. Analysts have taken note. As a Morgan Stanley report stated in April 2018:

[REDACTED]

[REDACTED]<sup>170</sup>

<sup>168</sup> **COEX-8.105** – [REDACTED] (*Phonorecords III* hearing exhibit 1373) AMZN00076220. [REDACTED]

[REDACTED]. Compare *id.*, rows 5 and 13, with **COEX-8.106** (*Phonorecords III* hearing exhibit 3056).

<sup>169</sup> **COEX-8.107** – Benjamin Swinburne, “Revival - Music Emerges as a Growth Industry,” Morgan Stanley Report, (April 2018). [REDACTED]

<sup>170</sup> *Id.* at 21. See also **COEX-8.108** – Amy X. Wang, “Amazon Music Is Available for Free Now,” Rolling Stone (Apr. 19, 2019) <https://www.rollingstone.com/music/music-news/amazon-music-free-now-824734/> (describing Amazon’s free tier music service as reflective of Amazon’s “interest[] in promoting its own software/hardware ecosystem” and as “a driver of Echo sales and advertising income”). The Morgan Stanley report stated more generally that “[REDACTED]” and further that “[REDACTED].”

88. As noted above, streaming music is commonly considered to be one of the core functions of the suite of Echo<sup>171</sup> devices,<sup>172</sup> and of course the Echo can also be used to purchase products on Amazon. In this respect, [REDACTED], Amazon's music offerings benefit Amazon's overall business in multiple ways that have concrete, multi-billion dollar benefits to Amazon: not only does music help drive sales of Amazon's devices, it also improves customer engagement with those devices and with Amazon's Alexa technology,<sup>173</sup> which customers, in turn, use to purchase goods through Amazon's retail channel.<sup>174</sup> Music forms an important part of Amazon's overall ecosystem,<sup>175</sup> as a driver for Echo speaker sales and customer migration to Prime and then enhanced purchasing on Prime, making these complementary business lines critical to consider when assessing music's contribution to the overall business.

<sup>171</sup> Amazon launched its smart speaker business in November 2014, and now offers a range of Echo smart speakers and devices with or without smart displays.

<sup>172</sup> **COEX-8.109** – “Echo Studio - High-fidelity smart speaker with 3D audio and Alexa,” Amazon <https://www.amazon.com/Echo-Studio/dp/B07G9Y3ZMC/>; **COEX-8.7** – Steve Kovach, “Here’s the most popular feature on the Amazon Echo,” Business Insider, May 10, 2016 <https://www.businessinsider.com/most-popular-amazon-echo-feature-2016-5> (“[T]he most popular function on the Echo is listening to music, Amazon's VP in charge of Echo Mike George said at the TechCrunch disrupt conference on Tuesday. ‘Music is very popular,’ George said. ‘It's one of the most obvious use cases.’”).

<sup>173</sup> See *Webcasting V*, SoundExchange Ex. 006 at PANWEBV 00004568 ([REDACTED])

<sup>174</sup> **COEX-8.110** – Jem Aswad, “Amazon Music’s Free Tier Is More Advertising Play Than Spotify Killer, Analysts Say,” Variety (Apr. 18, 2019) <https://variety.com/2019/biz/news/amazon-music-free-tier-is-more-advertising-play-than-spotify-killer-1203192957/> (discussing how Amazon’s free tier for Alexa users was designed to “boost its advertising income and sales of its Echo speakers” and, in turn, boost sales through voice ordering).

<sup>175</sup> UBS estimated in December 2020 that [REDACTED] of Prime members use some form of Prime Music. **COEX-8.88** – Eric Sheridan, “UBS Evidence Lab Inside: Examining the AMZN Consumer (2020),” UBS Securities, December 3, 2020, at 17.

89. Amazon does not disclose specific data about its growing hardware sales business, and analysts and investors are left to rely on inferences about its size.<sup>176</sup> However, it is clear that the impact is high on Amazon's overall ecosystem, given that sales of devices funnel directly into activity on Prime and use of Amazon's services such as Amazon Prime's video offerings. Alexa, Amazon's digital voice assistant is now available in many third-party devices and has become an omnipresent assistant for people in their everyday lives. Amazon disclosed in January 2019 that 100 million Alexa devices had been sold<sup>177</sup> and that figure jumped to "hundreds of millions" of devices by January 2020.<sup>178</sup> Amazon's revenue tied to its line of Echo speakers has expanded beyond smart speaker hardware sales to revenues tied to incremental e-commerce voice-driven sales, as consumer use their smart speaker to order from Amazon.com. Amazon can also realize additional revenue tied to Alexa skills as well as other hardware categories, such as wireless ear bud sales.<sup>179</sup>

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<sup>176</sup> A Wall Street Journal article stated, "Amazon has steadfastly refused to quantify the [hardware] business, and few if any Wall Street analysts have attempted to either." **COEX-8.111** – Dan Gallagher, Amazon's Hardware Is the Ultimate Black Box, Wall Street Journal (Oct. 1, 2021) <https://www.wsj.com/articles/amazons-hardware-is-the-ultimate-black-box-11633086181>. That same article quoted Dave Limp, Amazon's Head of Devices and Services, as saying that Amazon's goal has been to build devices "that are deeply ingrained with services," thus keeping users in Amazon's ecosystem.

<sup>177</sup> **COEX-8.113** – Lucas Matney, "More than 100 million Alexa devices have been sold," Tech Crunch (Jan. 4, 2019) <https://techcrunch.com/2019/01/04/more-than-100-million-alexa-devices-have-been-sold/>

<sup>178</sup> **COEX-8.114** – Ben Fox Rubin, "Amazon sees Alexa devices more than double in just one year," CNET (Jan. 6, 2020) <https://www.cnet.com/home/smart-home/amazon-sees-alexa-devices-more-than-double-in-just-one-year/>. While there is now fierce competition among Amazon, Google and Apple to continue to grow the reach of their digital assistants (Hey Google and Siri respectively), Amazon Echo users continue to far outpace Google Home users, keeping more consumers within Amazon's overall ecosystem. **COEX-8.115** – Sarah Perez, "Nearly 70% of US smart speaker owners use Amazon Echo devices," Tech Crunch (Feb. 10, 2020) <https://techcrunch.com/2020/02/10/nearly-70-of-u-s-smart-speaker-owners-use-amazon-echo-devices/>. Alexa can also be used in many new vehicles. See **COEX-8.23** – "Which Cars Have Amazon Alexa Integration?" Cars.com (Dec. 27, 2020) <https://www.cars.com/articles/which-cars-have-amazon-alexa-integration-431064/>

<sup>179</sup> Amazon's wireless ear buds are called Echo Buds.

90. Prior to Amazon launching its Unlimited streaming offering, [REDACTED]

[REDACTED]. According to its own internal strategy documents,<sup>180</sup> [REDACTED]

[REDACTED]

[REDACTED]<sup>181</sup> [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]<sup>182</sup> [REDACTED]

[REDACTED]

<sup>180</sup> [REDACTED] See **COEX-8.116** (*Phonorecords III* Hearing Exhibit 3225); **COEX-8.10** – [REDACTED] (*Phonorecords III* Hearing Exhibit 113) (AMZN00049815).

<sup>181</sup> **COEX-8.116** – [REDACTED], at 1-5.

<sup>182</sup> **COEX-8.116** – [REDACTED], at 5. When this price was introduced, Amazon was described as “pulling an Apple”: “Amazon might be pulling an Apple here, losing money on software in order to sell more hardware and make a much higher profit. While Echo and Dot seem to be hits and are the leading products in this new category, there very well may be more hardware devices from the company on the way. Using music streaming as a loss-leader to make it’s hardware more attractive has been tried by many companies though, particularly in the mobile space, and only Apple has been wildly successful with the strategy.” **COEX-8.117** – Bobby Owsinski, “Amazon Is Actually Losing Money From Its New Music Service,” *Forbes* (Oct. 18, 2016) <https://www.forbes.com/sites/bobbyowsinski/2016/10/18/amazon-music-service-losing-money/?sh=5ab491003bae>.

[REDACTED]  
[REDACTED]<sup>183</sup>

91. [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]<sup>184</sup> [REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]<sup>185</sup> As expected, the sale of Echo devices has gone on to generate significant revenue for Amazon. According to one analyst’s projections in 2016, such sales were expected to grow to \$4 billion by 2020.<sup>186</sup>

92. After the launch of Echo, Amazon went on become a leader in the smart speaker market on both a global and domestic scale.<sup>187</sup> The global smart speaker installed base has grown

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<sup>183</sup> COEX-8.116 – [REDACTED] at 5.

<sup>184</sup> COEX-8.118 – Amazon, [REDACTED] October 2016 (*Phonorecords III* Hearing Exhibit 118) at 4.

<sup>185</sup> *Id.*

<sup>186</sup> COEX-8.119 – Eugene Kim, “Amazon’s Echo and Alexa could add \$11 billion in revenue by 2020,” *Business Insider* (Sept. 23, 2016) <https://www.businessinsider.com/amazon-echo-alexa-add-11-billion-in-revenue-by-2020-2016-9>. The article states: “Amazon’s voice-controlled speaker Echo and the Alexa software that powers the device could be on the brink of opening up another huge business opportunity. According to a note by investment firm Mizuho, the revenue generated by the two services could exceed \$11 billion by 2020. The firm reckons that \$4 billion of that would come from the sales of the Echo device itself (including the Tap and Dot), while the other \$7 billion would come from all the commerce transactions derived from those devices to Amazon.com.”

<sup>187</sup> Observers have noted how Amazon has used its size and scale to contribute to its Echo success. The company frequently discounts its Echo smart speakers, even potentially selling them at a loss. An October 2020 *New York Times* article entitled “Don’t let Amazon get any Bigger” observed that: “While Amazon can rely on revenue from other parts of its empire to subsidize such loss leaders, smaller competitors, such as Sonos, can’t do the same.” The article also observed that Amazon restricted competitors from marketing their speakers on its site to protect its market share, and that “with Alexa functioning as the intermediary between users and the appliances and services they interact with, Amazon has gained a rich stream of data that it can use to expand into still more industries. Mr. Bezos has often

quickly. The installed base of smart speakers reached over 320 million globally in 2020 and is projected to grow to 640 million by 2024.<sup>188</sup> There were expected to be over [REDACTED],<sup>189</sup> and the market has remained strong in 2021. Amazon's market share has varied, but was estimated at [REDACTED] of shipments globally in 2020 versus [REDACTED] for Google.<sup>190</sup>

93. In analyses completed in 2019 and 2020, the global smart speaker shipment market was projected to reach \$ [REDACTED] in 2020,<sup>191</sup> a [REDACTED] share of that total would indicate Echo

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described Amazon's strategy as a 'flywheel' — the idea that momentum in each area of its business drives momentum in the others, creating a machine that spins ever faster.... Amazon exploits its power in one sector to take over neighboring markets. Each new conquest adds more momentum. The flywheel accelerates." **COEX-8.15** – Stacey Mitchell, "Don't Let Amazon Get Any Bigger," The New York Times (Oct. 8, 2020) <https://www.nytimes.com/2020/10/08/opinion/amazon-antitrust.html>.

<sup>188</sup> **COEX-8.120** – "Global smart speaker market 2021 forecast," Canalys, (Oct. 22, 2020) <https://www.canalys.com/newsroom/canalys-global-smart-speaker-market-2021-forecast>. It should be noted that smart speaker global and U.S. estimates can vary depending on the analyst or firm referenced. Omdia has estimated an installed base of 338.9 million devices in 2020, up from 138 million in 2019. Omdia projects 512 million devices in 2021. These figures all demonstrate the tremendous growth of the category. *See* **COEX-8.121** – Blake Kozak, Sr, "Global Smart Speaker market shipments hit 154 million in 2020 - up 58 percent YoY," Omdia (Feb. 23, 2021) <https://omdia.tech.informa.com/OM017328/Global-Smart-Speaker-market-shipments-hit-154-million-in-2020--up-58-YoY>

<sup>189</sup> **COEX-8.122** – "Global consumers continue to snap up smart speakers," Mike Paxson, S&P Global Market Intelligence (Kagan), August 20, 2019; **COEX-8.123** – "Demand for smart display units forecast to spike 80% in 2020," Mike Paxson, S&P Global, June 29, 2020 (*see also* supporting Excel attachments).

<sup>190</sup> **COEX-8.125** – "Market share of global smart speaker shipments from 3rd quarter 2016 to 4th quarter 2020, by vendor," Statista (2021) <https://www.statista.com/statistics/792604/worldwide-smart-speaker-market-share/> (sourced to Strategy Analytics). Kagan estimated Amazon's market share at [REDACTED]% of 2018 shipments in August 2019. **COEX-8.122** – "Global consumers continue to snap up smart speakers," Mike Paxson, S&P Global Market Intelligence (Kagan) (August 20, 2019).

<sup>191</sup> **COEX-8.122** – "Global consumers continue to snap up smart speakers," Mike Paxson, S&P Global Market Intelligence (Kagan), August 20, 2019; **COEX-8.123** – "Demand for smart display units forecast to spike 80% in 2020," Mike Paxson, S&P Global, June 29, 2020. These two articles combined represent the smart speaker market, including display unit data. *See* Excel attachments to these articles, "Worldwide smart speaker forecast," and "Worldwide Smart Display Forecast."



device revenue for Amazon of \$ [REDACTED].<sup>192</sup> Given that Amazon derives 68% of its revenue from the U.S.,<sup>193</sup> that would indicate a \$ [REDACTED] revenue stream for Amazon.

94. Estimates of the installed base for Amazon Echo speakers in the U.S. have ranged from 68.4 million units as of January 2021<sup>194</sup> to 86.9 million units in June 2021,<sup>195</sup> (with the range an indication of Amazon’s lack of disclosure around the data points). Analysts have estimated an average installed base of [REDACTED] units in 2020, and further estimated that there were an average of [REDACTED] speakers per home in 2020,<sup>196</sup> indicating that an average of just over 28 million U.S. homes were equipped with Echo speakers in 2020.

95. It is not surprising that Amazon is maximizing Echo market share, since Echo “smart speaker” owners are thought to spend even more with Amazon than Prime members, versus consumers not affiliated with either product. A January 2018 study found that “based on the spending patterns of Echo owners, Amazon can certainly subsidize sales of its Echo devices,” and “Amazon creates products and services that seek to promote retail shopping and deeper affiliation at Amazon.com.”<sup>197</sup> Another study found that Echo owners increase their spending at Amazon

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<sup>192</sup> While this number is [REDACTED] the previously mentioned \$4 billion for Echo sales in 2020, Amazon has been known to discount Echo prices in order to drive the installed base, and overall attendant benefits to the Amazon ecosystem. Cognizant of the many benefits of the highest installed base of Echo units possible in U.S. homes, Amazon has admitted to sometimes selling the units below cost. During an anti-trust hearing in July 2020, Amazon CEO Jeff Bezos said that at “its list price,” the company isn’t losing money on the Echo, suggesting it’s either breaking even or making a profit. However Bezos also admitted that “sometimes when it’s on promotion it may be below cost, yes.” **COEX-8.127** – Sean Hollister, “Amazon doesn’t sell Echo speakers at a loss, says Bezos — unless they’re on sale,” The Verge (July 29, 2020) <https://www.theverge.com/2020/7/29/21347121/amazon-echo-speaker-price-undercuts-rivals-loss-sale-antitrust-hearing>.

<sup>193</sup> **COEX-8.38** – Amazon 2020 Annual Report at 66.

<sup>194</sup> **COEX-8.129** – “The Infinite Dial 2021,” Edison Research.

<sup>195</sup> **COEX-8.128** – Todd Bishop, “Amazon maintains big lead over Google and Apple in U.S. smart speaker market, new study says,” GeekWire (Aug. 4, 2021) <https://www.geekwire.com/2021/amazon-maintains-big-lead-google-apple-u-s-smart-speaker-market-new-study-says/>.

<sup>196</sup> **COEX-8.25** – “The Infinite Dial 2020,” Edison Research.

<sup>197</sup> **COEX-8.130** – Ina Steiner, “Echo Surpasses Amazon Prime in Building Customer Loyalty,” eCommerce Bytes

significantly after purchasing a smart speaker, with the study establishing that buying an Echo leads to more spending on Amazon.<sup>198</sup>

96. Amazon also generates many billions of dollars of revenue in the U.S. from Prime. Amazon has not disclosed U.S. revenues attributable to Prime, but the number is in the tens of billions of dollars. Amazon has also not disclosed the number of U.S. Prime subscribers (it did disclose 200 million Prime Members Worldwide in April).<sup>199</sup> Estimates for the U.S. number have varied from 142 million<sup>200</sup> [REDACTED]<sup>201</sup> domestic Prime subscribers at year-end 2020 (an indication of Amazon’s lack of disclosure with regard to its U.S. statistics). [REDACTED]

[REDACTED]

[REDACTED]<sup>202</sup>

97. In 2020, Amazon earned over \$ [REDACTED]

[REDACTED]

[REDACTED].<sup>203</sup>

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(Jan, 4, 2018) <https://www.ecommercebytes.com/2018/01/04/echo-surpasses-amazon-prime-building-customer-loyalty/>.

<sup>198</sup> **COEX-8.131** – John Koetsier, “Research Shows that Amazon Echo Owners Buy 29% More from Amazon,” *Forbes* (May 30, 2018) <https://www.forbes.com/sites/johnkoetsier/2018/05/30/40k-person-study-buying-echo-increases-amazon-purchases-29-especially-cpg-items/?sh=49fa3e5b282e>.

<sup>199</sup> **COEX-8.134** – Jeff Bezos, “2020 Letter to Shareholders,” (Apr. 15, 2021) <https://www.aboutamazon.com/news/company-news/2020-letter-to-shareholders>, at 1.

<sup>200</sup> **COEX-8.135** – Tonya Garcia, “Amazon Prime member total reaches 142 million in U.S. with more shoppers opting in for a full year, data shows,” *Market Watch* (Jan. 20, 2021) <https://www.marketwatch.com/story/amazon-prime-member-total-reaches-142-million-in-u-s-with-more-shoppers-opting-in-for-a-full-year-data-shows-11611073132>.

<sup>201</sup> **COEX-8.88** – Eric Sheridan, “UBS Evidence Lab Inside: Examining the AMZN Consumer (2020),” *UBS Securities*, December 3, 2020, at 15.

<sup>202</sup> **COEX-8.136** – Seth Shafer, “Profile: Amazon Prime Video (US) 2021,” *S&P Global Market Intelligence* (Kagan), July 13, 2021. [REDACTED]

<sup>203</sup> Amazon’s “physical stores” and “AWS” revenues are omitted from the calculation of complementary revenues; Amazon’s e-commerce revenues, subscription services, and other revenue (which are primarily advertising revenue)

98. Although Amazon divulges very little information to the public about its cross-product effects, using Amazon's own internal documents, it is possible to estimate some of the revenues generated across Amazon's ecosystem from its interactive music products. Internal documents from Amazon that I have reviewed and understand were obtained in *Phonorecords III*

[REDACTED].<sup>204</sup> Since then, Prime Music has grown, both in active listeners and music offerings, and Amazon Music Unlimited, with its significant library and discounted price, has only expanded what Amazon is able to offer potential Prime members.

99. Using [REDACTED] % as a guide, we can estimate a minimum impact that the company's music services have had on current Prime membership numbers. At the figure of [REDACTED], Amazon would have accumulated, at minimum, [REDACTED] average Prime members as a result of its music services in 2020. As previously mentioned, [REDACTED]

[REDACTED].<sup>205</sup> Therefore, the [REDACTED] Prime members conservatively attributed to Prime Music and AMU will have supplied an additional \$ [REDACTED] in gross sales for Amazon. If we attribute 56% of those gross sales to third-party sellers (which is the average of the percentage units sold by third-party sellers in

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are included.

<sup>204</sup> COEX-8.105 – [REDACTED], at 18. This [REDACTED] % ([REDACTED]) includes only [REDACTED].

<sup>205</sup> This number may very well be much higher five years later, as Amazon has continued to expand in size, as well as in the number and type of product lines and services it offers. Amazon would have internal analysis of the type produced in 2016 that would provide this attribution estimate as of today, although I understand such analysis has not been made available by Amazon in this proceeding, at least at this stage.

2020)<sup>206</sup> and apply an average 15% commission to Amazon (even before accounting for additional fees, such as account fees),<sup>207</sup> that would indicate that Amazon derived \$ [REDACTED] of gross online sales from those music subscribers and \$ [REDACTED] in commissions from third party sellers, for a total net sales benefit of \$ [REDACTED]. In addition to this business, there are the direct revenues received through Prime membership fees themselves from this pool of Prime members attributable to the interactive streaming music product. At the Prime membership fee of \$119 and using the [REDACTED] mentioned above, the music product could generate an additional \$ [REDACTED] in Amazon revenue in 2020. The total of these two net revenue streams is [REDACTED]. At Amazon's EBITDA margin of [REDACTED]% in 2020, that would yield [REDACTED] of EBITDA attributable to music services.<sup>208</sup> This impact is also just one complementary product line vector, which we are able to estimate because of the acquisition of Amazon's internal documents.

100. My conclusions regarding the overall size of all three of the Big Tech Services' complementary business lines are summarized in Figure 3:<sup>209</sup>

<sup>206</sup> COEX-8.112 – Amazon Earnings Release Q4 2020.

<sup>207</sup> COEX-8.11 – Agatha Aviso, “Amazon Seller Fees: Cost of Selling on Amazon in 2021,” Fit Small Business (Sept. 30, 2021) (“Sale-related fees range from 6% to 45% of the product's selling price, with the average seller paying 15% . . .”).

<sup>208</sup> [REDACTED]

See COEX-8.112 – Amazon Earnings Release Q4 2019.

See COEX-8.112 –

Amazon Earnings Release Q2 2021.

<sup>209</sup> Certain of my conclusions set forth above (e.g., concerning Amazon's estimated revenues from sales of Echo devices) are incorporated into larger categories in this Figure.

**Figure 3**  
**Summary of Apple, Alphabet and Amazon Complementary**  
**Business Line Revenues (U.S. 2020)**

Summary of Estimated 2020 U.S. Revenues By Category	
Service and Category	Est. U.S. 2020 (\$ mil.)
<b>Apple Net Sales</b>	
iPhone	\$ 54,807
Mac	\$ 11,385
iPad	\$ 9,437
Wearables, Home & Accessories	\$ 12,180
AirPods	\$ 4,211
Apple Watch and Other	\$ 7,969
Services	\$ 21,388
<i>Apple Total</i>	\$ 109,197
<b>Alphabet Revenues*</b>	
Google Advertising	\$ 68,432
Google Search & Other	\$ 48,468
YouTube Ads	\$ 9,209
Networking Members' Props.	\$ 10,754
Google Other	\$ 10,112
<i>Alphabet Total</i>	\$ 78,544
<b>Amazon Net Sales**</b>	
Online Stores	\$134,705
Third-Party Seller Services	\$54,921
Subscription Services	\$17,206
Other	\$14,643
<i>Amazon Total</i>	\$221,475
<b>Total for Apple, Alphabet and Amazon</b>	
	\$409,216

\* Excluded Alphabet revenue categories: Google Cloud; Other Bets; Hedging Gains.

\*\* Excluded Amazon net sales categories: AWS; physical stores.

Apple Net Sales are for Fiscal 2020 (October 2019 - September 2020)

Sources: 2020 Annual Reports of Apple, Alphabet and Amazon. The U.S. revenues are derived by applying each company's overall percentage of U.S. revenues to its listed reporting segments. Apple (39.8%), Alphabet (46.6%) and Amazon (68.3%).

101. Figure 4 compares my findings regarding the size of the Big Tech Services' complementary business lines in 2020 (for the US and globally) to their combined reported US revenues from their interactive streaming offerings. As this Figure makes clear, these Services' revenues from their combined U.S. complementary business lines were [REDACTED] [REDACTED] their combined U.S. interactive streaming revenues in 2020, and their combined global complementary business lines were [REDACTED] their combined U.S. interactive streaming revenues:



**C. The Services use music to bring in and retain customers, so they keep their music streaming prices low and discount extensively**

102. The Services have realized that they can obtain substantial financial and strategic benefits by under-pricing their interactive music streaming offerings. Their strategy is focused on acquiring and retaining customers through music, and to accomplish this, they have set the prices for their music offerings very low. These lower prices enable the Services to grow their customer base and reap the attendant rewards, which include increased revenues on complementary business lines and increased share prices as discussed above, and which also include less tangible but still significant benefits such as greater brand loyalty and recognition and strategic hedges. Accordingly, the Services have kept the pricing for interactive music streaming low, in that it does not reflect the value of their offerings to consumers or the value they derive from music in their other business lines, but rather is designed to bring customers into their ecosystems and keep them there. Pricing in the interactive music streaming market is not set as a business strategy to maximize streaming revenue or profits, but rather is dominated by the need to maximize market share, be competitive with other services, and prioritize potential future profits and complementary business line revenues (either from completely controlling the market for music by restricting entry into the market or by deriving profits in other businesses, thereby maximizing gains in other business areas).

103. The major DSPs have long offered essentially the same premium music product at a similar standard price point of \$9.99 per month. \$9.99/month was the price point set by Spotify when it launched in the U.S. in 2011, and, [REDACTED]

[REDACTED]

██<sup>210</sup> At least some of the other Services appear to have adopted the same standard price point of \$9.99/month for a premium streaming

██<sup>211</sup>.

104. Each of the Services has stuck to that standard \$9.99/month price point set by Rhapsody more than a decade ago and adopted by Spotify ten years ago.<sup>212</sup> The fact that the non-discounted headline price has remained at \$9.99/month for over a decade for individual plans has resulted in a diminution of real prices over time given the impact of inflation alone.<sup>213</sup>

105. This lack of price increases in the interactive music streaming market is also striking given that the value of the Services' offerings for consumers have increased significantly through libraries that have more than doubled and the introduction of features such as high-definition audio. At the time of the last Phonorecords proceeding, the total number of tracks available on the Services was approximately 30 million.<sup>214</sup> Today, the Services offer access to

<sup>210</sup> *Phonorecords III*, Hearing Transcript, 1741:15-1742:14, 1801:23-1802:16 (Page).

<sup>211</sup> *Phonorecords III*, Hearing Transcript, 224:1 – 225:15 (Levine) (██).  
██).

<sup>212</sup> **COEX-8.140** – Spotify Premium - Spotify (US), <https://www.spotify.com/us/premium/>; **COEX-8.141** – Amazon, Amazon Music Unlimited FAQ, <https://www.amazon.com/b?ie=UTF8&node=15730321011>; **COEX-8.142** – Pandora - Choose how you want to listen, <https://www.pandora.com/>; **COEX-8.158** – YouTube Music Premium - YouTube, <https://www.youtube.com/musicpremium>; **COEX-8.143** – Apple - Apple Music, <https://www.apple.com/apple-music/>

<sup>213</sup> Although Spotify has raised prices on some of its discount plans in certain regions, *see* **COEX-8.144** – Natasha Daily, “Spotify is increasing its prices — here’s which plans are getting more expensive,” Business Insider (Apr. 27, 2021) <https://www.businessinsider.com/spotify-raising-premium-prices-family-plan-subscription-2021-4>, those price increases have not kept pace with inflation. *See* **COEX-8.145** – Mark Mulligan, “Spotify pushes prices up, but do not expect dramatic effects,” MIDiA Research (Apr. 27, 2021) <https://www.midiaresearch.com/blog/spotify-pushes-prices-up-but-do-not-expect-dramatic-effects> (observing that report in 2019 had shown that “since its launch, Spotify’s \$9.99 price point had lost 26% in real terms due to inflation while over the same period Netflix (which increased prices) saw a 63% increase”).

<sup>214</sup> *See*, for example, **COEX-8.24** – “Introducing Apple Music — All The Ways You Love Music. All in One Place,” Apple (June 8, 2015) <https://www.apple.com/newsroom/2015/06/08Introducing-Apple-Music-All-The-Ways-You-Love-Music-All-in-One-Place-/>; **COEX-8.147** – “Apple Music Versus Spotify Versus Tidal: Everything You Need to Know,” Forbes (Jun. 8, 2015) <https://www.forbes.com/sites/jaymcgregor/2015/06/08/apple-music-vs-spotify-vs->



over 70 million tracks<sup>215</sup> on those same platforms, a more than 100% increase in just five years. Some of the Services have also rolled out high-definition audio streaming (often called “lossless” or “hifi” or “HD” audio), which appeals to consumers who have the financial wherewithal to purchase high-end audio equipment that can discern the difference between “lossless” and “lossy” music files. Amazon debuted its “HD” offering in September 2019 for its Unlimited service.<sup>216</sup> Amazon originally charged its subscribers an additional \$5 per month to upgrade to the HD tier.<sup>217</sup> In May 2021, Apple announced that it would make lossless streaming available for Apple Music subscribers (as well as, for some tracks, “spatial audio”), at no additional cost.<sup>218</sup> Following that announcement, Amazon reduced its pricing to match Apple, by eliminating the additional \$5 monthly fee it had been charging its customers for its HD offering.<sup>219</sup> Spotify has also announced plans to add high-definition audio streaming to its service, but it has not yet announced whether its users will be charged extra for this improvement.<sup>220</sup> This pricing behavior by Amazon (and by

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tidal-everything-you-need-to-know/?sh=1b5547a5415f

<sup>215</sup> See, for example, **COEX-8.148** – Thomas Germain, “Best Music Streaming Services,” Consumer Reports (Sept. 3, 2021) <https://www.consumerreports.org/streaming-music-services/best-music-streaming-service-for-you-a2126039193/>, which reviews the various streaming services with over 70 million songs, with Apple and Amazon credited with 75 million songs.

<sup>216</sup> **COEX-8.149** – Dieter Bohn, Chris Welch, Amazon Music rolls out a lossless streaming tier that Spotify and Apple can’t match (Sept. 17, 2019) <https://www.theverge.com/2019/9/17/20869526/amazon-music-hd-lossless-flac-tier-spotify-apple>.

<sup>217</sup> **COEX-8.150** – Sarah Perez, Amazon makes its lossless music streaming service a free upgrade (May 17, 2021) <https://techcrunch.com/2021/05/17/amazon-makes-its-its-lossless-music-streaming-service-a-free-upgrade/>.

<sup>218</sup> **COEX-8.151** – “Apple Music announces Spatial Audio with Dolby Atmos; will bring Lossless Audio to entire catalog,” Apple (May 17, 2021) <https://www.apple.com/newsroom/2021/05/apple-music-announces-spatial-audio-and-lossless-audio/>.

<sup>219</sup> **COEX-8.152** – Amazon Music HD, <https://www.amazon.com/music/unlimited/hd> (“HD Music For All / Now at no extra cost.”); **COEX-8.150** – Sarah Perez, Amazon makes its lossless music streaming service a free upgrade (May 17, 2021) <https://techcrunch.com/2021/05/17/amazon-makes-its-its-lossless-music-streaming-service-a-free-upgrade/>.

<sup>220</sup> **COEX-8.153** – “Five Things to Know About Spotify HiFi,” Spotify Newsroom (Feb. 22, 2021) <https://newsroom.spotify.com/2021-02-22/five-things-to-know-about-spotify-hifi/>; **COEX-8.154** – Nick Pino, Spotify HiFi release date, price, quality, features, rumors and song catalog (Aug. 17, 2021)

Apple for that matter) provides compelling evidence that there is no effort or interest on the part of the services to charge more for music, as their goals are located elsewhere in their ecosystems and they do not appear inclined to risk any loss of their valuable consumer bases built on music to a lower-priced service.

106. Not only have the Services kept their individual premium subscription prices at this low level of \$9.99/month, they have also introduced a number of discounted plans, free trials, advertising-supported offerings, and bundles that reduce pricing to consumers even further.

107. Spotify’s discount plans are \$12.99/month for a two-account “duo” subscription; \$15.99/month for its family plan; and \$4.99/month for a student plan.<sup>221</sup> Apple, Google, and Pandora each charge \$14.99/month for their family plans and \$4.99/month for their student plans.<sup>222</sup>

108. Amazon’s Unlimited service is subject to an even greater variety of discounts. All Prime members can subscribe to Unlimited for \$7.99/month or \$79/year.<sup>223</sup> A single-device plan is available for \$3.99/month for users of Amazon devices.<sup>224</sup> A family plan is available for \$14.99/month or \$149/year.<sup>225</sup>

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<https://www.techradar.com/news/spotify-hifi-release-date-price-quality-features-rumors-and-song-catalog>.

<sup>221</sup> **COEX-8.140** – <https://www.spotify.com/us/premium/>.

<sup>222</sup> **COEX-8.143** – Apple - Apple Music, <https://www.apple.com/apple-music/>; **COEX-8.158** – YouTube Premium Family Plan - YouTube, <https://www.youtube.com/musicpremium>; **COEX-8.142** – <https://www.pandora.com/upgrade/premium/family-plan>; <https://www.pandora.com/upgrade/premium/student>; <https://www.pandora.com/upgrade/premium/military>. Pandora also offers a military discount at \$7.99/month.

<sup>223</sup> **COEX-8.141** – Amazon, Amazon Music Unlimited FAQ, <https://www.amazon.com/b?ie=UTF8&node=15730321011>.

<sup>224</sup> This plan is only usable on Amazon devices. “For \$3.99/month, listen to Amazon Music Unlimited on a single Echo, Echo Dot, Echo Show, Echo Look, Amazon Tap, or Fire TV.” *Id.*

<sup>225</sup> *Id.*

109. Amazon offers its deepest discounts to college students. Students can subscribe to Prime for one-half of the normal price, or \$6.49/month, after receiving a 6-month free trial of Prime.<sup>226</sup> They can then subscribe to Unlimited for just \$0.99/month.<sup>227</sup>

110. In addition to these discounted pricing plans, the Services also offer free trial periods. Apple offers a general, three-month free trial,<sup>228</sup> and it also has a program with Verizon to offer six months of free Apple Music to new and current Apple subscribers.<sup>229</sup> Amazon offers a 90-day free trial for its Unlimited Service to consumers “who purchase an eligible item shipped and sold by www.amazon.com, sign up for an eligible Amazon subscription (e.g. Prime, Kindle Unlimited, Prime Video Channel), or register an eligible device in the Alexa app,” and in this way again promote sales of their complementary product lines through its music offerings.<sup>230</sup> Google offers a one-month free trial to YouTube Music Premium,<sup>231</sup> and it also offers a three-month free trial to YouTube Premium (a subscription service that includes YouTube Music Premium) for purchasers of various Google devices such as Google Home and Nest.<sup>232</sup> Spotify offers both a one-month free trial to its Premium service as well as a three-month free trial for users who pay

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<sup>226</sup> **COEX-8.155** – Amazon - Amazon Prime Student, <https://www.amazon.com/Amazon-Student>

<sup>227</sup> *Id.*

<sup>228</sup> **COEX-8.156** – Apple Free Trial, <https://music.apple.com/us/listen-now?at=1000l4QJ&ct=402&itscg=10000&itsct=402x>.

<sup>229</sup> **COEX-8.157** – Apple Music, Verizon Unlimited Plan Users Get 6 Free Months, [https://www.verizon.com/solutions-and-services/apple-music/?adobe\\_mc=MCMID%3D02488034622052996202614052052067786645%7CMCORGID%3D777B575E55828EBB7F000101%2540AdobeOrg%7CTS%3D1631741923](https://www.verizon.com/solutions-and-services/apple-music/?adobe_mc=MCMID%3D02488034622052996202614052052067786645%7CMCORGID%3D777B575E55828EBB7F000101%2540AdobeOrg%7CTS%3D1631741923).

<sup>230</sup> **COEX-8.141** – Amazon, Amazon Music Unlimited 90 Days Free, <https://www.amazon.com/b?ie=UTF8&node=18746818011>

<sup>231</sup> **COEX-8.158** – YouTube Premium Family Plan- YouTube, <https://www.youtube.com/musicpremium>.

<sup>232</sup> **COEX-8.86** – Nest + YouTube Premium, <https://www.youtube.com/yt/terms/yp-nest/>.

using PayPal.<sup>233</sup> Pandora offers a 3-day free trial for its Pandora Plus service and a 60-day free trial for its Pandora Premium service.<sup>234</sup>

111. The Services also offer a number of free-to-consumer, ad-supported interactive streaming services. Spotify has argued that its ad-supported offering is a “funnel” for its subscription service.<sup>235</sup> Spotify recently doubled down on its loss-leader ad supported service, by trialing a less restrictive ad-supported service for \$0.99/month that allows for greater functionality than its free service.<sup>236</sup> The ad-supported version of YouTube Music allows users to listen to any song they want if using on a web browser or on the app, without being restricted to certain playlists or number of tracks, and upload their own music, with a decrease in sound quality versus the regular service and the presence of advertising.<sup>237</sup> Pandora’s ad-supported service allows listeners to access music and podcasts through personalized stations, which they can develop by interacting with the platform. In this way, the service generates stations specific to each listener.<sup>238</sup>

112. Amazon customers without Prime or a subscription to Amazon Music Unlimited can listen to a more narrow ad-supported service for free. This service offers users access to select playlists and music stations. The ad-supported service is a more narrow offering than Amazon

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<sup>233</sup> **COEX-8.140** – Spotify Premium – Spotify (US), <https://www.spotify.com/us/premium/>; **COEX-8.159** – Spotify – Get 3 months of Spotify Premium for free, <https://www.spotify.com/us/claim/paypal/>.

<sup>234</sup> **COEX-8.142** – “Choose how you want to listen,” <https://www.pandora.com/upgrade>.

<sup>235</sup> Spotify recently stated that 60% of its premium subscribers came from its ad-supported tier. **COEX-8.80** – Digital, Culture, Media and Sport Committee, “Economics of music streaming,” UK Parliament House of Commons (July 15, 2021) at 87.

<sup>236</sup> **COEX-8.160** – Jon Porter, “Spotify is testing a less restrictive ad-supported tier costing \$0.99 a month,” The Verge (Aug. 3, 2021) <https://www.theverge.com/2021/8/3/22607203/spotify-plus-ad-supported-tier-unlimited-skips-on-demand-listening>.

<sup>237</sup> See “Get started with YouTube Music,” <https://support.google.com/youtubemusic/answer/6313529> (last visited October 12, 2021).

<sup>238</sup> **COEX-8.32** – Sirius XM 2020 Annual Report at 8.

Music Prime, which offers users on-demand access to two million songs, thousands of play lists and personalized streaming stations to Prime members.<sup>239</sup> Amazon’s ad-supported service is said (by Amazon) to be a way to funnel more users to Prime, and thus support Amazon’s overall ecosystem. Making this service more widely available outside of Echo devices, which happened in 2019,<sup>240</sup> was a way to encourage more consumers to join Prime if they wish to listen ad-free music. As discussed, Prime members spend more with Amazon, which is an important source of Amazon’s profits.<sup>241</sup>

113. An ad-supported service also fits with Amazon’s strategy of becoming a much larger player in the advertising market, thus forming part of Amazon’s larger enterprise-wide ambitions,<sup>242</sup> and serves to increase the value and sales of its Echo speakers and Alexa functions.<sup>243</sup>

114. The Services have also introduced a number of bundles as yet another way of discounting their music offerings and to grow subscribers. Amazon bundles Prime Music in for free with the Prime membership (which currently costs \$119/year), which allows users access to a catalog of 2 million songs (versus 75 million in the Unlimited offering) and curated playlists.<sup>244</sup> Amazon has a bundle giving new subscribers access both to Unlimited and to e-book service

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<sup>239</sup> For a discussion of Amazon’s various music offerings, *see* **COEX-8.162** – Amazon - What are the Differences Between the Amazon Music Subscriptions, <https://www.amazon.com/gp/help/customer/display.html?nodeId=GW3PHAUCZM8L7W9L>

<sup>240</sup> **COEX-8.163** – “Amazon Music gives the gift of free streaming,” Amazon (Nov. 18, 2019) <https://www.aboutamazon.com/news/entertainment/amazon-music-gives-the-gift-of-free-streaming>.

<sup>241</sup> **COEX-8.164** – Sarah Perez, “Amazon makes its music streaming service free with ads,” Tech Crunch (Nov. 19, 2019) <https://techcrunch.com/2019/11/19/amazon-makes-its-music-streaming-service-free-with-ads/>.

<sup>242</sup> **COEX-8.165** – Mark Mulligan, “Amazon’s Ad Supported Strategy Goes Way Beyond Music,” MIDiA Research (Apr. 17, 2019) <https://www.midiaresearch.com/blog/amazons-ad-supported-strategy-goes-way-beyond-music>.

<sup>243</sup> **COEX-8.110** – Jem Aswad, “Amazon Music’s Free Tier Is More Advertising Play Than Spotify Killer, Analysts Say,” Variety (Apr. 18, 2019) <https://variety.com/2019/biz/news/amazon-music-free-tier-is-more-advertising-play-than-spotify-killer-1203192957/>.

<sup>244</sup> **COEX-8.166** – Amazon Music Prime, <https://www.amazon.com/music/prime>.

Audible Premium Plus for free for three months.<sup>245</sup> Amazon also presently offers a bundle with the Disney+ VOD service, allowing Unlimited subscribers free access to the Disney+ service for six months.<sup>246</sup> Spotify has bundled with Hulu for years,<sup>247</sup> and offered free Hulu access to premium subscribers in 2019;<sup>248</sup> Spotify also has a Hulu and Showtime bundle for students, seemingly offered at no extra costs to the customer as the bundle is priced at the standard student discount price of \$4.99.<sup>249</sup> Spotify's Premium service is also available for free to certain AT&T customers,<sup>250</sup> as is Pandora's Premium service.<sup>251</sup>

115. Apple Music also now forms part of the Apple One bundle, which also includes Apple TV+, Apple Arcade, iCloud, Apple News+ and Apple Fitness+.<sup>252</sup> The full service costs \$29.95/month.<sup>253</sup> Discussing this offering on July 28, 2021, CEO Tim Cook commented:

We're offering Apple One because it makes enjoying our subscription services easier than ever before, including Apple Music and Apple TV+ and Apple Arcade and iCloud and more," adding "And more importantly, it's a great customer benefit because many of our customers like to try out more than one of these services, and it allows them to do that with one easy bundle and subscription service."<sup>254</sup>

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<sup>245</sup> **COEX-8.167** – <https://www.amazon.com/music/amazon-music-audible-deals?tag=usatdeals-20>.

<sup>246</sup> **COEX-8.168** – <https://www.amazon.com/music/amazon-music-disney-plus-promotion>.

<sup>247</sup> **COEX-8.31** – Spotify 2018 Q1 Press Release at 2.

<sup>248</sup> **COEX-8.169** – Michele Debczak, "Spotify Is Giving Premium Customers Free Hulu," Mental Floss (Mar. 12, 2019) <https://www.mentalfloss.com/article/576723/spotify-premium-customers-get-free-hulu>.

<sup>249</sup> **COEX-8.170** – Spotify Premium Student, <https://www.spotify.com/us/student/>.

<sup>250</sup> **COEX-8.171** – Spotify and AT&T, <https://support.spotify.com/us/article/atandt/>.

<sup>251</sup> **COEX-8.61** – Pandora 2018 Q2 Earnings Call, at 3.

<sup>252</sup> **COEX-8.172** – Apple - Apple One, <https://www.apple.com/apple-one/>.

<sup>253</sup> *Id.*

<sup>254</sup> **COEX-8.81** – Apple 2021 Q3 Earnings Call at 15.

**D. The Services’ underpricing reflects competition for customers with high lifetime value**

116. The Services’ pricing decisions also reflect their focus on the customer lifetime value (LTV)<sup>255</sup> of their users. As one example, when asked during an earnings call about “discounted and Family Plans” that “benefit users but weigh on ARPU and your year-over-year Premium revenue growth,” Spotify’s CFO explained that such discounting reflected Spotify’s “focus on LTV,” saying, “we’ve really been in a mode of growing market share, and it’s all been about growing users and growing subscriber. And as we’ve talked about on a number of calls, we really focus on LTV to SAC and making sure that we’re adding subscribers that we believe will be profitable and profitable over the long-term.”<sup>256</sup>

117. Spotify has described its own overall profitability as a “managed outcome” and a “by-product” of its primary business goals, namely, growth and increased customer lifetime value. Spotify’s former Chief Financial Officer Barry McCarthy explained during a 2018 earnings call that Spotify’s profit margins are a “by-product of the pace [it] choose[s] to invest” in areas that will drive Spotify’s growth and increase customer lifetime value:

If you think back to our commentary during Investor Day, we made 2 important points. One is profit margin as a managed outcome is a by-product of the pace we choose to invest in new features and functionality to drive growth. Second point is the 3 ways to invest in growth; one is marketing; two is geographic expansion; which we’re pursuing aggressively; and three is investment in features and functionality that drive a better user experience which drives more engagement, which drives more customer sat[isfaction] drives more word-of-mouth and organic growth, improves LTV and, importantly improves LTV-to-[CAC] ratio.<sup>257</sup>

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<sup>255</sup> The customer lifetime value, simply put, is essentially the profit delivered by that customer over the lifetime the customer is with the service provider. See, for example: <https://corporatefinanceinstitute.com/resources/knowledge/valuation/lifetime-value-calculation/>.

<sup>256</sup> **COEX-8.43** – Spotify 2020 Q2 Earnings Call, at 17.

<sup>257</sup> *Id.*, **COEX-8.43** – Spotify 2018 Q3 Earnings Call, at 7 (emphasis added). “CAC” refers to customer acquisition costs. [REDACTED]

118. Spotify CEO Daniel Ek has repeatedly acknowledged that acquiring customers is the priority for Spotify, not profits. Responding during a 2018 earnings call to a question about a price increase in Norway, Mr. Ek similarly stated, “Well, let me up a level and then say you should not expect to see price increases from us across markets. We’re playing a market share game, we’re not playing [a] margin game.”<sup>258</sup> During another earnings call in 2020, Mr. Ek gave a similar answer in response to the question of whether Spotify would change its subscription pricing, stating, “No. Again, our primary strategy is growth, as we said before, rather than maximizing revenue . . . .”<sup>259</sup> In an interview in April 2020, Mr. Ek similarly stated, “We’re in the growth stage, trying to capture that growth. Eventually, we will get to more of a point of maturity where we’ll focus more on profit over growth, but for the next few years it’s going to be predominantly growth for us,” Mr. Ek said.<sup>260</sup>

119. The Services’ low pricing of their music services is designed to help them acquire customers with high lifetime value (reducing churn) as opposed to a response to potential subscribers’ ability or willingness to pay. For example, while claiming college students have a low ability to pay for music, the Services are not extending the same level of discounts to other cohorts who may have limited discretionary income, such as retirees and people who rely on public

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██████████ *Phonorecords III* Hearing Transcript, 2081:13-2083:3 (McCarthy).

<sup>258</sup> *Id.*, **COEX-8.43** – Spotify 2018 Q2 Earnings Call, at 11. Mr. Ek further explained that “There may be opportunities for us in individual markets to test price elasticity like we’re doing in Norway, but don’t expect a shift in strategy.” *Id.*

<sup>259</sup> *Id.*, **COEX-8.43** – Spotify 2020 Q1 Earnings Call, at 13. Mr. Ek stated that Spotify has “adjust[ed] pricing in some territories” to account for inflation but that “it’s not something that we’re focusing on in the short term.” *Id.*

<sup>260</sup> **COEX-8.174** – Tim Ingham, “Loss-making Spotify will continue to put growth ahead of profit for ‘next few years,’” *Music Business Worldwide* (May 6, 2020) <https://www.musicbusinessworldwide.com/loss-making-spotify-will-continue-to-focus-on-growth-over-profit-for-next-few-years/>.



assistance.<sup>261</sup> This is presumably because the Services perceive that (and likely have data showing that) college students generally have a high customer lifetime values because of factors such as their future earning potential and relatively high interest in music.

120. The Services derive value from music customers in numerous ways that make the generation of subscription revenue secondary to them. As discussed in detail above, acquiring such customers allows the Services to boost revenues on their complementary product and service lines. As these diversified firms acquire new customers, they cross-sell these customers across their wide range of products and services. Cross-selling takes place when a customer is driven to purchase complementary or add-on products when making a purchase from a company. For example, an Apple iPhone user who uses her phone to stream music from Apple Music may also purchase Apple AirPods for a better listening experience, and an Apple Watch, in order to get more utility from her device investment. An Amazon Prime music user, in addition to purchasing more goods from Amazon than non-prime members, may elect to subscribe to Kindle via Amazon and purchase an Echo device to better leverage her use of Prime. Amazon is advanced at cross-selling when a customer makes a purchase on Prime – it has developed a sophisticated algorithm to recommend products to customers at the ideal time, driving up customer purchase volumes.

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<sup>261</sup> Such discounts are possible. Amazon offers a discount for its Prime service (but not music specifically) to recipients of government assistance, for example. **COEX-8.175** – “Prime is just \$5.99/month for qualifying government assistance recipients,” Amazon <https://www.amazon.com/58f8026f-0658-47d0-9752-f6fa2c69b2e2/qualify>. The discount appears to be available only for up to four years, however. See “Sign Up for the Discounted Prime Offer,” Amazon <https://www.amazon.com/gp/help/customer/display.html/?nodeId=G54BETR9USUZFW5> (last visited October 11, 2021). Thus, over a four-year period, persons eligible for the government assistance-related discount would pay more than students would under the student Prime discount, specifically, \$287.52 (48 months multiplied by \$5.99/month) as compared to students who would pay just \$272.58 (42 months, accounting for the 6-month trial offered to students, multiplied by \$6.49/month). As noted, students Prime members also can also subscribe to Amazon Music Unlimited for just \$1/month, a benefit that does not appear to be extended to Prime members eligible for the government assistance-related discount.

Amazon has attributed 35% of its revenue to cross-selling.<sup>262</sup> For Google, while Search and other related areas make up the majority of its revenues, its YouTube and Maps advertising businesses are growing quickly, allowing it more options to offer advertisers.<sup>263</sup>

121. The Services also extract valuable commercial data from their music streaming user bases, which they leverage in connection with selling advertisements. Pandora has explained that it takes advantage of a “wealth of data,” including “more than 85 billion elements of feedback from [its] listeners and their musical tastes,” which it uses “to deliver the right ad to our listeners at just the right moment.”<sup>264</sup> Spotify invites its advertisers to “[c]onnect with your target audiences across platforms with Spotify’s first-party age, gender, and location data”; it enables location targeting down to the postal code, interest targeting based on the types of music, podcast, and other content a user consumes, “real-time context targeting” based on the “mood” of the music a user is consuming, and other targeting options.<sup>265</sup> [REDACTED]

[REDACTED]<sup>266</sup> All

<sup>262</sup> **COEX-8.176** – Morgan Quinn, “12 ways Amazon gets you to spend more,” CBS News (June 20, 2016) <https://www.cbsnews.com/media/12-ways-amazon-gets-you-to-spend-more/>.

<sup>263</sup> **COEX-8.177** – Megan Graham, “How Google’s \$150 billion advertising business works,” CNBC (May 18, 2021) <https://www.cnbc.com/2021/05/18/how-does-google-make-money-advertising-business-breakdown-.html>.

<sup>264</sup> **COEX-8.178** – Pandora 2017 Q3 Prepared Remarks; *see also, e.g.,* **COEX-8.32** – Pandora 2018 Q3 Financial Report at 8 (“With billions of data points that help us understand our users’ preferences, we offer both local and national advertisers the opportunity to deliver targeted messages to our listeners using a combination of audio, display and video advertisements.”); **COEX-8.180** – “How Pandora Turns Personalization into \$1 Billion in Ad Revenue (VB Live),” VentureBeat (Oct. 22, 2018) <https://venturebeat.com/2018/10/22/how-pandora-turns-personalization-into-1-billion-in-ad-revenue-vb-live/> (Pandora has a “wealth of personal data” from its users to “identify really specific, really niche groups of people” for its advertisers, allowing its advertisers to reach “the right audience with their message.”); **COEX-8.181** – Eric Suliga, “The Only Tool You Need to Make ‘Big Data’ Actionable,” Pandora (July 19, 2017) <https://www.pandoraforbrands.com/article/make-big-data-actionable> (explaining how Pandora’s “Audience Explorer” tool allows its advertisers to review “the treasure trove of data we have on listening trends and audience behavior,” from which Pandora, as of 2017, had identified “over 2,300 targeting segments”).

<sup>265</sup> **COEX-8.182** – “Targeting on Ad Studio,” Spotify, [https://ads.spotify.com/en-US/help-center/targeting-ad-studio/#real\\_time\\_context\\_targeting](https://ads.spotify.com/en-US/help-center/targeting-ad-studio/#real_time_context_targeting)

<sup>266</sup> **COEX-8.78** – [REDACTED] at 36.

premium services can also use the user data from their paid tiers to improve music discovery and minimize churn, which better supports their larger business goals and increases the lifetime value to them of their paid users.

122. Acquiring new customers is also a key to increasing revenues attributable to brand loyalty. Brand loyalty exists when consumers repeatedly elect to purchase a company's products and services versus those of a competitor, and in the case of the Services can extend to their entire ecosystem. Brand loyalty can be an extremely valuable attribute for a company, and can be quantified as an intangible asset ("goodwill") on their balance sheets.<sup>267</sup>

**E. The streaming services offer substitutable music products**

123. Each of the Services offers access to materially the same library of songs, including the catalogs of all three major record labels and all of the larger independent labels as well.<sup>268</sup> The Services do not appear to compete materially for exclusive music content.<sup>269</sup> This is very different

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<sup>267</sup> Apple is commonly cited as an example of a company with a high degree of brand loyalty, to which its music products contribute. Apple has almost 2 billion iPhone customers, many of whom eagerly await a new model to be able to rush out and upgrade their devices. Investopedia cites Apple as an example of brand loyalty, stating "Apple's reputation for innovative products and excellent service has helped to create a loyal customer following that's extremely unlikely to switch to a competitor. As the company rolls out more fee-based services, including Apple TV and gaming, the company is likely to add to its share of wallet, meaning more revenue per client. As consumers get hooked on new shows and other services, they'll gladly upgrade to the latest iPhone or tablet when needed. Through innovative products and new services, Apple can further cement the brand loyalty of their existing clients and attract new ones as well." **COEX-8.183** – Brand Loyalty, Investopedia, <https://www.investopedia.com/terms/b/brand-loyalty.asp>.

<sup>268</sup> **COEX-8.173** – Anne Steele, "Music Streamers Tap Live Events to Stand Out," The Wall Street Journal (July 10, 2019) ("With all the services offering essentially the same library of songs, an exclusive performance is meant to signal to fans why they should subscribe to one in particular").

<sup>269</sup> There are historical examples of the Services competing upstream on price for exclusive content, and so this expected business approach is certainly a part of the industry, but the Services have chosen not to pursue this path, and the market is characterized by a lack of significant exclusive content. *See, e.g.*, Xiomara Blanco, "The biggest streaming music exclusives of 2016," CNET (Dec. 21, 2016) <https://www.cnet.com/tech/mobile/streaming-music-exclusives-2016/>; Peter Kafka, "Now Amazon has a music exclusive, too: It's the only place to stream Garth Brooks," Vox (Oct. 19, 2016) <https://www.vox.com/2016/10/19/13327420/amazon-garth-brooks-streaming-exclusive-ghosttunes>; Romain Dillet, "Spotify launches new series of original recordings called Spotify Singles," Tech Crunch (Dec. 1, 2016) <https://techcrunch.com/2016/12/01/spotify-launches-new-series-of-original-recordings-called-spotify-singles/>.

from how the Services approach other markets, and from how Apple, Amazon, Netflix and Hulu have approached the video streaming market, for example.<sup>270</sup> If a firm is seeking to maximize profits from streaming products, the expected market strategy would involve seeking to license content exclusively. The Services use this business model in adjacent markets like VOD and podcasts. The video streaming services (including Apple and Amazon) allocate billions of dollars to obtaining exclusive content to drive subscriptions and reduce subscriber churn.

124. The absence of upstream market competition among Services for music exclusives stands in contrast to their approach to the podcasting space. As expected, podcasting competition has led to an influx of deals for exclusive content in the space, as the major streaming services compete to acquire the best content, pushing up the value of podcast content.<sup>271</sup> The Services have collectively invested billions of dollars in podcast content, including acquiring podcasters outright or acquiring exclusive rights to content. As described above in Sections IV.C and IV.D, Spotify and Pandora have been investing heavily in the podcast space as part of their strategies to diversify beyond music, with Spotify spending over \$1 billion in recent years on podcast content.

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<sup>270</sup> Apple had a brief foray into exclusives, making deals with Drake and Taylor Swift for early releases, but did not continue to pursue that strategy in a material way, in contrast to the VOD market. **COEX-8.16** – Tim Ingham, “Apple Music’s Biggest Swipe At Spotify Yet: Drake’s Exclusive New Album,” Music Business Worldwide (April 10, 2016) <https://www.musicbusinessworldwide.com/apple-musics-biggest-swipe-at-spotify-yet-drakes-exclusive-new-album/>.

<sup>271</sup> Podcasting has been in existence for over two decades but in the last five years has gained increasing popularity. The number of monthly U.S. podcast listeners is projected to grow to 117.8 million in 2021, with over 50% of adults aged 18-34 estimated to listen to podcasts monthly. **COEX-8.146** – “Podcast Industry Report: Market Growth and Advertising Statistics in 2021,” Insider Intelligence (July 29, 2021) <https://www.insiderintelligence.com/insights/the-podcast-industry-report-statistics/> Podcast ad spending is projected to grow from \$708 million in 2019 to over \$1 billion in 2021 and to \$2 billion by 2023. **COEX-8.139** – “U.S. Podcast Ad Revenues Grew 19% YoY in 2020; set to exceed \$1B this year and \$2B by 2023,” IAB (May 12, 2021) <https://www.iab.com/news/us-podcast-ad-revenues-grew-19-yoy-in-2020-set-to-exceed-1b-this-year-and-2b-by-2023/>.

125. Apple has kept pace with Spotify in the upstream competition for podcast content, even as they do not compete against each other upstream for content in the music space.<sup>272</sup> Besides creating original podcast content in its TV studio, Apple also acquired Scout FM in 2020, a start-up that automatically creates curated lists of podcasts.<sup>273</sup>

126. In June 2021, Apple introduced a subscription podcasting service in more than 170 countries and regions in which listeners can purchase subscriptions for individual shows and groups of shows.<sup>274</sup> Apple describes its subscription program as “a global marketplace for users to discover exclusive content and support their favorite creators.”<sup>275</sup> Subscribers can get early access to content and enjoy ad-free listening, with the pricing set by the podcast creators. Apple will keep 30% of the revenue only in the first year, and 15% thereafter.<sup>276</sup>

127. Amazon Music is also investing in the podcast space and seeking to acquire exclusive content. Amazon became more active in the market in September 2020, announcing the launch of a podcast service integrated with Amazon Music,<sup>277</sup> which started with more than 70,000 podcasts,<sup>278</sup> and also offers exclusive content. Amazon made a further commitment to podcasting

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<sup>272</sup> *Id.*

<sup>273</sup> **COEX-8.138** – Steve Dent, “Apple confirms it bought podcast curation app Scout FM earlier this year,” *engadget* (Sept. 25, 2020) <https://www.engadget.com/apple-reportedly-bought-the-topic-based-podcast-app-scout-fm-084109915.html>.

<sup>274</sup> **COEX-8.133** – “Apple Podcasts Subscriptions and channels are now available worldwide,” Apple (June 15, 2021) <https://www.apple.com/newsroom/2021/06/apple-podcasts-subscriptions-and-channels-are-now-available-worldwide/>

<sup>275</sup> **COEX-8.81** – Apple 2021 Q3 Earnings Call at 5.

<sup>276</sup> **COEX-8.132** – Todd Spangler, “Apple Unveils Podcast Subscriptions,” *Variety* (Apr. 20, 2021) <https://variety.com/2021/digital/news/apple-podcast-subscription-services-1234955558/>

<sup>277</sup> **COEX-8.126** – Bill Rosenblatt, “Amazon Takes On Spotify In Podcasting,” *Forbes* (Sept. 18, 2020) <https://www.forbes.com/sites/billrosenblatt/2020/09/18/amazon-takes-on-spotify-in-podcasting/?sh=11d970763459>.

<sup>278</sup> **COEX-8.124** – Anne Steele, “Amazon Music Joins Podcast Fray,” *The Wall Street Journal* (Sept. 17, 2020) [https://www.wsj.com/articles/amazon-music-joins-podcasting-fray-11600261201?mod=article\\_inline](https://www.wsj.com/articles/amazon-music-joins-podcasting-fray-11600261201?mod=article_inline).

when it agreed to buy Wondery, one of the largest independent podcast producers, in a deal said to be worth \$300 million in December 2020.<sup>279</sup>

128. The Services’ lack of upstream competition for exclusive music content as noted also stands in contrast to the VOD market. The VOD market is dominated by services such as Netflix, Disney Plus, Hulu, HBO Max, Apple TV+ and Amazon Prime Video, each of which offers consumers a large amount of exclusive content unavailable on competing platforms. Netflix allocated some █% of its content budget to originals in 2020, a figure expected to grow to █% by 2024. Netflix spent over \$█ of its total \$█ content spend in 2020 on originals,<sup>280</sup> and in the twelve months ending of June 2021 generated EBITDA of \$█, for a █% margin.<sup>281</sup> This follows years of spend by Netflix on original content, and enabled it to raise its margin from █% in █. Video streaming services also initiate price increases to cover the costs of original content and maintain and grow their profitability.

129. To date music stands as an outlier in terms of the lack of upstream competition among Services for licensing exclusive content from third parties, competition that would be expected to raise upstream prices for music content licenses.

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<sup>279</sup> **COEX-8.101** – Benjamin Mullin, “Amazon to Acquire Podcaster Wondery,” The Wall Street Journal (Dec. 31, 2020); **COEX-8.100** – Spencer Soper, “Amazon’s Purchase of Wondery is a Big Bet on Podcast Advertising,” Bloomberg (Jan. 7, 2021) <https://www.bloomberg.com/news/articles/2021-01-07/amazon-s-purchase-of-wondery-is-a-big-bet-on-podcast-advertising>.

<sup>280</sup> **COEX-8.85** – Deana Myers, “Big 4 SVOD services have monster combined content budget,” S&P Global Market Intelligence (Kagan), November 16, 2020.

<sup>281</sup> **COEX-8.184** – S&P Capital IQ.

**F. Spotify's financial success reflects its successful focus on growth over profit margin**

130. Spotify is an example of the rewards that can be reaped in certain markets from focusing on growth at the expense of current profitability in this market. As explained above, Spotify has acknowledged it has been focused on subscriber and user growth rather than profitability. This is because it profits substantially from this approach, and its shareholders receive profits in the present from the company's potential future accounting profits. In this sense, Spotify's shareholders have a very divergent interest from copyright owners who are paid a share of Spotify's current revenues from music products.

131. In 2016, when *Phonorecords III* began, Spotify was a privately owned company valued at approximately \$8.5 billion.<sup>282</sup> Since going public in April 2018, its market capitalization increased from \$28.6 billion at the end of May 2018 to \$59.1 billion in early February 2021, with its market cap standing at \$[REDACTED] on September 30, 2021.<sup>283</sup> Spotify also recently raised \$1.3 billion in the debt markets, in an offering completed February 26, 2021.<sup>284</sup>

132. Spotify has also accumulated a substantial amount of cash on hand. As of Q2 of this year, it held \$3.5 billion in cash and cash equivalents, and short-term investments (approximately \$3.75 billion in U.S. dollars).<sup>285</sup> That is [REDACTED] its cash reserves in January

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<sup>282</sup> **COEX-8.83** – Brittany Umar, Spotify's New Funding Round Values Music Streamer at \$8.5 Billion, *The Street* (June 10, 2015) (HX-2952); <https://www.cnn.com/2015/05/01/spotify-raises-350-million-at-8-billion-valuation-sources.html>.

<sup>283</sup> **COEX-8.184** – S&P Capital IQ.

<sup>284</sup> **COEX-8.73** – Stuart Dredge, "Spotify \$1.3bn debt funding is 'for general corporate purposes'," *Music Ally* (Feb. 25, 2021) <https://musically.com/2021/02/25/spotify-1-3bn-debt-funding-is-for-general-corporate-purposes/>. This increase in Spotify's market capitalization has created enormous wealth for its owners. Its 38-year-old cofounder and CEO Daniel Ek, for example, is presently estimated to have a net worth of \$3.9 billion. See *Forbes* - Daniel Ek, <https://www.forbes.com/profile/daniel-ek/?sh=2b6bf41546ab> (last visited on October 9, 2021).

<sup>285</sup> **COEX-8.51**– Spotify 2021 Q1 Financial Report at 22; **COEX-8.31** – Spotify 2021 Q2 Press Release at 7.

2016.<sup>286</sup> Spotify's gross margin has grown from █% in 2016 to █% in 2020. Despite currently having negative net income, Spotify is doing well financially by many measures.<sup>287</sup>

**VI. The Services' business practices that the Copyright Owners' *Phonorecords III* experts identified are still present and in many cases are more prevalent today**

133. In preparing this report, I reviewed the written testimony of various experts who testified on behalf of the Copyright Owners in the last *Phonorecords* proceeding. Many of those experts made observations about the Services' business practices and the interactive streaming market more generally (including identifying trends and making predictions) that are not only pertinent to the topics I address in this report, but that also have proven quite prescient. These experts include:

- Professor Marc Rysman of Boston University, whose direct report covered topics such as the reasons why streaming services may defer and displace revenues and profits, and whose rebuttal report covered topics such as the reasons why the Services keep their margins low or negative, why current revenues and profits underrepresent the true economic value of the Services' music offerings, and how the Services' practices of discounting prices have led to substantially lower revenues for them;<sup>288</sup>

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<sup>286</sup> **COEX-8.184** – S&P Capital IQ.

<sup>287</sup> Market estimates show Spotify becoming EBITDA positive in 2021, with EBITDA growing to \$ █ by 2023. **COEX-8.184** – S&P Capital IQ.

<sup>288</sup> I have already described various portions of Mr. Rysman's testimony elsewhere in this report. To avoid redundancy I do not repeat discussion of such sections here, but the portions already discussed also show that Mr. Rysman made many accurate and significant observations about this market, particularly with respect to his discussion of the reasons why streaming services displace and defer their profits and revenue because of features such as network effects and learning about customers. See, for example, *Phonorecords III*, Rysman Written Direct Testimony ¶¶ 13-26.



- Jim Timmins of Teknos Associates LLC, whose rebuttal report covered topics such as the health of the music streaming market and the impact of the Big Tech Services entering that market; and
- Christopher C. Barry of PricewaterhouseCoopers LLP, whose rebuttal report covered the Services’ complementary products and business models and the ways in which GAAP-based financial statements do not provide a complete view into company results and future performance.

134. One of the topics that these experts discussed, as I have in this report, is how the Services have used music to drive sales of complementary products. For instance, Professor Rysman and Mr. Timmins each gave written testimony about the Big Tech Services’ leveraging of music to realize gains elsewhere in their ecosystem. Professor Rysman stated:

. . . [I]n many cases, music services may realize the benefits of customer acquisition not through their own music service but through related services that are marketed along with the music service. For example, a diverse Internet company such as Google offers suites of services, such as online storage, e-mail, calendar applications and office productivity software for free. The entry of Apple, Amazon, and Google into music streaming appears to be part of competition between their entire “eco-systems,” rather than just a decision related to music alone. These firms may profit not just from traditional Internet revenue sources such as advertising and consumer data, but also from selling related hardware, such as iPhones, Kindle Fire tablets, Amazon Echo hands-free speakers, and Nexus phones.<sup>289</sup>

135. Mr. Timmins, who testified that the interactive music streaming market was growing and prospering (and was correct on both counts), similarly observed that for a number of streaming services in the market, including some of the participants in that proceeding, “music helps drive sales of hardware and other services.”<sup>290</sup> He further observed, “[A]ll of the large,

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<sup>289</sup> *Phonorecords III*, Rysman Written Direct Testimony ¶ 29.

<sup>290</sup> *Phonorecords III*, Timmins Written Rebuttal Testimony ¶ 33.

diversified companies which have arrived in this market – in particular Amazon, Apple, and Google – have deep pockets and a continued incentive to subsidize their music services (*i.e.*, treat their music services as a loss leader) in order to realize value elsewhere in their enterprises.”<sup>291</sup>

136. Since Professor Rysman and Mr. Timmins offered that testimony, the Big Tech Services’ ecosystems and their complementary product lines have expanded substantially. Apple’s AirPods, for example, were not even available until the end of 2016.<sup>292</sup> Today, as I have explained, Apple makes billions of dollars in the US from its AirPods sales alone. The potential rewards to the Services from leveraging music to drive sales of such complementary products have only increased since these experts gave their testimony in the last proceeding.

137. Professor Rysman also observed that the “pure play” Services at the time were incentivized to pursue diversification of their business lines in order use music to realize the benefits from sales of complementary products: “[P]articularly for streaming services that are integrated into larger companies, the service may generate revenue from complementary services and products. For services that are not integrated, the prospects for integration can be an important source of potential future revenue.”<sup>293</sup> Mr. Barry observed relatedly that “[REDACTED]

[REDACTED]”<sup>294</sup> As I describe at length in my report, since the last proceeding, both Spotify and Pandora have now become diversified companies through developments such as investments in their podcasting and advertising businesses and, in Pandora’s

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<sup>291</sup> *Phonorecords III*, Timmins Written Rebuttal Testimony ¶ 80.

<sup>292</sup> **COEX-8.62** – “Apple AirPods Are Now Available,” Apple <https://www.apple.com/newsroom/2016/12/apple-airpods-are-now-available/>.

<sup>293</sup> *Phonorecords III*, Rysman Written Direct Testimony ¶ 27.

<sup>294</sup> *Phonorecords III*, Barry Written Rebuttal Testimony ¶ 6.

case, by having been acquired by a larger, more diversified parent company. They too are now reaping the rewards of having complementary product lines alongside interactive music streaming offerings.<sup>295</sup>

138. These experts also gave testimony concerning the Services’ incentives, particularly Spotify’s and Pandora’s, to prioritize growth over current profits. Mr. Timmins observed that Spotify, Pandora, and others “employed (and in some cases still employ) a traditional strategy for emerging growth companies with a digital product: acquire as many users as quickly as possible in order to capture large or even dominant market share.”<sup>296</sup> Mr. Barry similarly noted that “[i]n the early stages of a business, investments in infrastructure, product development and customer acquisition frequently results in such businesses’ showing accounting losses during this period. It appears that this is what Spotify and Pandora have done and it is, therefore, not surprising that these two companies have not been profitable from a GAAP standpoint.”<sup>297</sup> Professor Rysman further observed that the benefits of gaining market share and realizing greater revenues from sales of complementary products incentivizes the Services more generally to keep their margins low: “. . . [I]n a market like music streaming with network effects, economies of scale, switching costs and learning, firms naturally compete with very low or negative margins today, in order to obtain

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<sup>295</sup> Professor Rysman observed that companies need not be merged or acquired in order to generate revenue from complementary products because “[c]omplementary effects from integration can [also] be achieved by contract.” *Phonorecords III*, Rysman Written Direct Testimony ¶ 27. An example of this can be seen in the Pandora-SoundCloud partnership I have described above, wherein Pandora is realizing revenues through the placement of targeted advertising on a third-party platform.

<sup>296</sup> *Phonorecords III*, Timmins Written Rebuttal Testimony ¶ 69.

<sup>297</sup> *Phonorecords III*, Barry Written Rebuttal Testimony ¶ 11; *see also id.* ¶ 31 (“My analysis of the Spotify and Pandora GAAP results and forecasts indicates that they are both high-growth development stage enterprises. Management used available earnings and cash for new customer acquisition, business development, new products and advertising. Non-content costs as a percentage of revenue are higher for development stage enterprises than mature enterprises, because the former are building infrastructure and customer base more intensively.”)

market share in the future or for the sale of complementary goods.”<sup>298</sup> As I have detailed in this report, these practices and incentives very much remain a feature of the Services’ business models today, as reflected by the Services’ low pricing for their music offerings (including their free offerings and discounts).

139. Professor Rysman also gave testimony concerning the Services’ bundling practices, including [REDACTED] [REDACTED] as well as Spotify’s then-recently announced bundle with the New York Times.<sup>299</sup> As I describe in this report, bundles are now a prevalent part of the Services’ business models, including for Spotify, who presently has bundles with Hulu, Showtime, and AT&T.

140. These experts also testified as to the economic value that such business practices can create even when the business does not show accounting profits. Mr. Timmins, whose background is in venture capital and investment banking, noted that “accounting profits are only one of several factors that are considered by companies and investors weighing the costs and benefits of entering an immense and rapidly growing market such as music streaming.”<sup>300</sup> Mr. Barry, a financial and forensic accountant, observed, “GAAP-based financial statements are a starting point for an analysis to determine profitability, financial position and cash flows. . . . Even from an accounting perspective, focusing only on past results, particularly for high-growth businesses like Spotify and Pandora, can be misleading.”<sup>301</sup> Professor Rysman similarly explained

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<sup>298</sup> *Phonorecords III*, Rysman Written Rebuttal Testimony ¶ 7; *see also id.* ¶ 13.

<sup>299</sup> *Phonorecords III*, Rysman Written Rebuttal Testimony ¶¶ 30, 36.

<sup>300</sup> *Phonorecords III*, Timmins Written Rebuttal Testimony ¶ 54.

<sup>301</sup> *Phonorecords III*, Barry Written Rebuttal Testimony ¶¶ 10-11.

that the Services’ claimed lack of profits from their music offerings did not tell the full story of their economic success:

Each of the services claims that their interactive streaming business has never been profitable. Does this mean each of these services does not have a viable business? The large market capitalization of Spotify suggests otherwise. Spotify has experienced a massive increase in its valuation over the last several years, during which time a remarkable number of sophisticated firms have also entered the industry. These market participants’ value is not found in current profitability – or even in the profitability of their streaming service itself – but is found in other areas or metrics. Thus, it appears that services and their investors find this market very attractive, regardless of what they show in their accounting data.<sup>302</sup>

141. Those observations were proven correct. Spotify remains a key example. While Spotify has reported profits in certain quarters since going public, in others quarters it continues to report losses, and yet despite this record, its market capitalization has increased more than five-fold since the last proceeding. Spotify’s prioritization of growth over profits was then and remains today attractive to investors and a key generator of value for the company. Professor Rysman observed in 2016 that despite its lack of profitability, Spotify’s valuation had increased “from \$1.0 billion in June 2011 to \$8.5 billion in June 2015.”<sup>303</sup> Since that time, Spotify’s value has increased by another 40 billion dollars.<sup>304</sup>

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<sup>302</sup> *Phonorecords III*, Rysman Written Rebuttal Testimony ¶ 64. I also reviewed the written rebuttal testimony of Professor Joshua Gans, who similarly observed, “Particularly with respect to companies such as Apple, Google, and Amazon, I would expect significant– if not dominant– company value from interactive streaming to be recognized in companion or complementary business value metrics, not in the accounting line item for music streaming subscriptions.” *Phonorecords III*, Gans Written Rebuttal Testimony ¶ 74. Professor Gans also made a number of observations about the likelihood of the Services’ fixed and non-content costs decreasing relative to their service revenue as these companies and their offerings mature (with particular focus on Spotify’s). *See id.* ¶¶ 41-42, 48-50 & App’x A ¶¶ 6-8. As I have noted above, Spotify has openly been pursuing moving its cost base from “variable to fixed”; and the topic of the Services’ non-content costs is again addressed in this proceeding in the accompanying report of Professor Richard Watt.

<sup>303</sup> *Phonorecords III*, Rysman Written Direct Testimony ¶ 33; *see also Phonorecords III*, Rysman Written Rebuttal Testimony ¶ 11 n.3.

<sup>304</sup> Professor Rysman also discussed how Spotify would stack up to other companies were it to go public with an \$8.5 billion valuation. *Phonorecords III*, Rysman Written Direct Testimony ¶ 105. In fact, when Spotify did go public in 2018, its market capitalization was nearly \$30 billion. **COEX-8.55** – “Spotify Stock Goes Public, Giving

## VII. Conclusion

142. As set forth above, music streaming in the United States is now the predominant format for music consumption, and it continues to grow. In the space of interactive music streaming, the market has become highly concentrated into the hands of diversified companies. Among these top services are Apple, Amazon and Google, three of the largest companies in the world that have grown in size significantly since the last proceeding and that have large ecosystems and sets of complementary business lines that dwarf their respective music offerings. Each uses music and the customer base created by its music offerings to promote its other business lines and increase the overall value of its enterprise.

143. Spotify and Pandora, which are the other two top streaming services in this space, are now diversified. Each now has revenues outside of interactive music streaming but which have been built on its music consumer base. In Spotify's case, it has invested heavily in podcasting and is pursuing a goal of being a generalized audio platform. In Pandora's, its acquisition by Sirius XM has placed its interactive streaming offerings within a much larger corporate structure, and its advertising business has also allowed it to diversify.

144. The Services are focused on growth, particularly the growth of the consumer base attracted to their music offerings. They keep their music streaming prices low and offer discounts, free trials, and ad-supported offerings as well. They do so to compete for, and retain, customers with high expected lifetime value. Music helps the Services build their brands and consumer

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the Streaming Music Giant a \$30 Billion Market Cap," Bloomberg (Apr. 3, 2018), *available at* <https://fortune.com/2018/04/03/spotify-stock-market-cap-ipo-direct-listing/>.

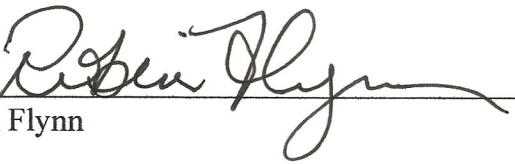
reliance on their overall ecosystems, collect user data and monetize it, and maximize their revenues from their complementary products.

145. The Services' music offerings are like commodities. The Services are not meaningfully competing for content in their music offerings in the same way they are in podcasts, where they are spending billions of dollars in order to differentiate themselves.

146. Spotify has realized tremendous success through its business model, as reflected by the facts I describe above, including the dramatic increase of its market capitalization.

147. I understand that additional materials may be disclosed in the course of this proceeding and reserve the right to amend or supplement my analysis and conclusions based on that information. In addition, updated public information may become available over the course of this proceeding, and I reserve the right to modify my testimony based on such information.

I, Robin Flynn, declare under penalty of perjury that the statements contained herein are true and correct to the best of my knowledge, information and belief. Executed on October 13, 2021 in Pacific Grove, California.

  
Robin Flynn



## APPENDICES

### Appendix A: Curriculum Vitae

#### Robin V. Flynn

**S&P GLOBAL MARKET INTELLIGENCE / Kagan** | New York, NY | Jan. 1988-July 2020

*Managing Director of Research / Senior Director / Senior Research Analyst*

Founded in 1969, Kagan (currently an offering of S&P Global Market Intelligence) is a leading media research and publishing firm. As Managing Director of Research and Senior Analyst, Ms. Flynn oversaw a team of analysts covering the streaming media, multichannel television, broadcast television, radio, and satellite radio sectors. Joined firm in 1988 as Associate Analyst/Appraiser, working on cable TV, radio and television station valuations and *Cable TV Finance* and *Broadcast Investor: Deals & Finance* newsletters. Was promoted to Analyst in 1990 and given additional responsibility of managing the company's international operations in Europe, Latin America and Asia. Became Senior Analyst and Associate Director in 1994, with expanded corporate responsibilities over the company's U.S. and worldwide consulting and newsletter operations. In 1996, took over the broadcasting division. In 2001, assumed responsibility for the cable TV and multichannel divisions. Over the period of decades at Kagan, served as Senior Analyst on *Broadcast Investor* and *Cable TV Investor* as well as numerous white papers and special reports dedicated to development of those industries, including in the area of streaming music and digital radio. Promoted to Research Director in 2015, Senior Director of Research in 2016, and Managing Director in 2019, assuming leadership of the S&P Global MI Industry Research group spanning multiple industries including media, financials & insurance, energy, and leveraged finance.

Has also authored, contributed to or supervised dozens of special reports and publications on broadcast/multichannel/streaming media, including multiple editions over three decades of such publications as *The Economics of Internet Music and Radio*, *Radio Deals & Finance*, *TV Station Deals & Finance*, *Radio/TV Station Annual Outlook*, *Broadcast Industry Overview*, *Benchmarking Cable TV Advertising Statistics*, *Economics of Outdoor & Out of Home Advertising*, *The Economics of Mobile Music*, *The Economics of Broadcast TV Retransmission Revenue*, *The Broadband Cable Financial Databook*, *The State Of DBS*, *Benchmarking Cable MSO Financial Statistics*, *Mediacast*, *Media Mergers & Acquisitions*, *Global Multichannel Markets 2002*, and *Kagan Media Money*. As Senior Broadcast Analyst, also has served as the lead analyst and moderator for dozens of Kagan seminars/conferences, including The Kagan Media Summit, TV & Radio Finance Summit, TV Station Values & Finance, The Multichannel Summit, Radio Station Values & Finance, and Kagan Broadband Cable Summit.

**Kagan World Media** | Carmel, CA | 1988-2001 and London, England | 1988-2000

*Vice President/Senior Analyst*

One of the key founders of KWM global businesses. Given corporate responsibility in 1990 for international operations spanning Europe, Eastern Europe, Latin America and Asia. Increased operations from a single newsletter in 1988 to 13 newsletters, 15+ databooks, 12 yearly

conferences and an active consulting operation. Managed, hired, and trained London staff numbering 15-20. Served as Senior Analyst on the following newsletters:

*European Cable/Pay TV*  
*Latin American Cable/Pay TV*  
*Asia Media Investor*  
*European Television*  
*European Radio*  
*Euromedia Mergers & Acquisitions*

*European Media Finance*  
*European Home Video*  
*European Cable TV Programming*  
*International Co-Productions*  
*Future of Media in Eastern Europe*

Also authored or contributed to numerous special reports on global media, including European Television, European Radio, European Cable/Pay TV, Latin American Cable/Pay TV, Asia Cable & Satellite and European Media Finance, among many others. As Senior Analyst, moderated and/or organized semi-annual Kagan conferences on media topics in locations including London, Paris, Madrid, Rome, Brussels and Hong Kong, among others.

**Kagan Media Appraisals** | Carmel, CA | 1988-2018

KMA engaged in consulting, expert witness and valuation assignments and performed appraisals of media assets aggregating more than \$100 billion. Managed the division, overseeing all consulting assignments. Acted as consultant and lead analyst on KMA's cable TV, DBS, broadcast television, digital television, radio, Internet radio and international projects and was responsible for fair-market-value appraisals of numerous cable TV, television and radio stations. Provided valuation testimony and trial exhibits in litigation.

**Overseas Private Investment Corp.** | Washington, D.C. | 1987

*Finance Intern:* Served as Financial Analyst on OPIC Finance Projects. Analyzed historical and projected financial condition of prospective OPIC clients. Performed political and economic risk analyses of prospective host countries. Developed reports on and made presentations to OPIC Finance Committee on viability of proposed projects.

**Scudder, Stevens & Clark** | Boston, MA | 1984-1985

*Marketing Associate:* Successfully developed and implemented marketing strategy for new international fund for Canadian institutional investors. Translated and supervised in-house production of French marketing material.

**EDUCATION:**

Monterey Institute of International Studies, Monterey, CA  
MBA, International Management

Monterey Institute of International Studies, Monterey, CA  
Graduate Division of Translation & Interpretation

Duke University, Durham, NC  
BA, French

**SELECTED CLIENT INFORMATION:**

Ms. Flynn has participated in the appraisal of over \$30 billion in cable/broadcast properties over several decades. Some selected clients and services are as follows:

**Radio Station/Digital Radio/Streaming Music**

Arbitron, Consulting Service on Radio & Digital Radio  
BlueMountain Capital Management, Consulting Service on Terrestrial & Digital Radio  
Community Broadcasters, Valuation Services  
Finger Lakes Radio, Valuation Services  
First Broadcasting, Valuation Services  
Colorado Public Radio, Valuation Services  
GE Financial Services  
Goldman Sachs, Valuation Services  
Krystal Broadcasting, Inc., Valuation Services  
Jones Day Revis & Pogue, Expert Witness Services  
Main Street Broadcasting, Valuation Services  
Mercury Capital Partners, Valuation Services  
Momentum Media Capital, Consulting Services  
MyStar Comm., Strategic Consulting  
Nassau Broadcasting, Valuation Services  
Northern Lights Broadcasting, Valuation Services  
NRJ Ventures, Valuation Services  
Pacific Lutheran University, Valuation Services  
Pappas Telecasting, Valuation Services  
Piedmont Broadcasting, Valuation Services  
Premier Radio Stations, LLC, Valuation Services  
Public Radio Capital, Valuation Services  
TD Bank, Valuation Services  
Trust One Bank, Valuation Services  
Union Broadcasting, Valuation Services  
U.K.-based hedge fund, consulting services, broadcast radio & Internet music and radio streaming

**Cable/International**

Caracol Television, S.A., Valuation Services  
Chamberlain, Hrdlicka *et al.*, Expert Witness, Trial Exhibits, U.K. Cable TV Valuation  
Citigroup, Consulting Services  
Comporium Cable, Valuation Services  
Individual client, Valuation Services, Potential Valuation Testimony, Polish Cable TV  
IRS, Cable Valuation Services  
Kleinwort Benson, U.K. Cable Valuation Issues  
SJI, LLC, Cable & Television Valuation  
UPC Programming, BV, Strategic Analysis, International Cable TV  
Daniels Fund, Valuation Services  
Intel Corp., Consulting Services

**TV Station**

Andrews & Kurth, Expert Witness Services  
BNY Capital Markets, Consulting Services  
Champlain Valley Telecasting, Valuation Services  
City Colleges of Chicago, Valuation Services  
Coast Community College District, Valuation Services  
Connecticut Public Broadcasting Network, Valuation Services  
Dow, Lohnes & Albertson, Expert Witness Services  
Fortress Credit, Valuation Services  
French & Lyon, Valuation Exhibits for Trial  
Golden Link TV, Valuation Services  
Greenhill & Co., Consulting Services  
Independence Public Media of Philadelphia, Inc., Consulting Services  
Merrill Lynch, Valuation Services (TV and Radio)  
National Datacast, Valuation Services  
Palm Beach City Red Cross, Valuation Services  
Pappas Telecasting, Valuation Services  
Paul Weiss Rifkind, Strategic Analysis  
RTV Ventures, Valuation Services  
Washington State University, Valuation Services  
WBIN-TV, Inc., Valuation Services  
Western Alliance Bank, Valuation Services

**Past Expert Assignments:**

Stanton John Barns v. Cencom et al., 1995-1996  
Johnson Broadcasting v. Universal, 2001  
Entercom v. Royce International, 2001  
Sonsinger Broadcasting v. Paxson Communications, 2001  
Children's Broadcasting v. Disney/ABC, 2002  
Opportunity Capital Corp., et al. v. Hawes-Saunders Broadcast Properties, 2002  
Amrac Telecomms. et al. v. Pegasus Communications et al., 2002-2003  
Adelphia Communications, 2003-2004  
BEN v. AT&T et. al., 2003-2004  
SESAC v. Television Music License Committee, 2005-2006  
Arahova et al. (in re: Adelphia Communications), 2005-2006  
Adelphia Communications v. Deloitte & Touche, 2007  
Denver Radio Company, Chapter 11 Proceedings, 2007-2008  
Adelphia Recovery Trust v. Bank of America, N.A. et al. 2009-2010  
United States of America v. American Society of Composers, Authors and Publishers, 2009-2011  
VOOM HD Holdings, LLC v. Echostar Satellite LLC (for plaintiff) 2008-2012  
Adelphia Recovery Trust v. FPL Group Inc., et al. (for plaintiff) 2011-2012  
Deseret Management Corp. v. USA (for defendant) 2010-2012  
USA v. ASCAP in re Petition of Pandora Media, Inc. (for defendant) 2013-2014  
SESAC v. Television Music License Committee (for SESAC) 2016  
Lieberman Broadcasting, Inc. et al v. Comcast Corp et al (for Comcast) 2016

DirecTV, LLC vs. Nexstar Broadcasting Inc. (for defendant) (current)

**PARTIAL LIST OF SPEAKING ENGAGEMENTS / PRINT MEDIA:**

Panelist, yearly National French Cable TV conference, Médiaville, 1989-1993  
Moderator, Worldwide Cable TV Symposium, Western Cable Show, Anaheim, CA, 1995-1997  
Featured Analyst, Network Radio Presentation to U.S. Advertisers' Assn., 1999  
Panelist, Western Cable Show, 2003  
Panelist, BCFM Annual Conference, 2004  
Keynote Speaker IPTV Technology Summit, 2006  
Keynote Address, iHollywood Triple Play Summit, 2006  
Panelist, Hispanic Radio Summit, 2008  
Panelist, MMTC Access to Capital Conference, 2008  
Moderator, Radio and Internet Summit West, 2011-2013  
Panelist/Moderator, Radio Ink Forecast Event, 2008-2014  
Moderator, Cable MSO Summit/Multichannel Summit, 2010-2016  
Panelist, S&P Global, M&A Overview of TMT Industry, 2016  
Speaker, NAB Futures Summit, various dates including 2016-2017  
Moderator, NAB's TV on Wall Street, 2013 and 2017  
Moderator, TVB Forward Conference, 2015 & 2018  
Panelist, NAB Streaming Summit, 2018  
Keynote Speaker, Media Ad Sales Summit, 2019  
Moderator & Panelist, S&P Global User Conference, 2019  
Moderator, TV & Radio Values & Finance/Kagan Media Summit, 2009-2020

Quoted in *The Wall Street Journal*, *The New York Times*, *USA Today*, *NY Post*, *CNNMoney.com*, *Forbes*, *Daily Variety*, *Hollywood Reporter*, *Cable World*, *Broadcasting & Cable*, *Multichannel News*, *Radio Ink*, *Radio Business Report*, *Los Angeles Times*, *San Francisco Chronicle*, *San Jose Mercury News* and other regional, national and international publications.

**Appendix B: Publications and Reports for Past 10 Years**

<i>Publication</i>	<i>Date</i>	<i>Author(s)</i>
[REDACTED]	2011	Robin V. Flynn
[REDACTED]	10/26/2011	Justin Nielson Robin V. Flynn
[REDACTED]	10/31/2011	Robin V. Flynn
[REDACTED]	11/17/2011	Robin V. Flynn
[REDACTED]	11/18/2011	Robin V. Flynn
[REDACTED]	11/22/2011	Robin V. Flynn
[REDACTED]	12/14/2011	Robin V. Flynn
[REDACTED]	12/16/2011	Robin V. Flynn
[REDACTED]	12/21/2011	Robin V. Flynn
[REDACTED]	2012	Robin V. Flynn
[REDACTED]	2012	Robin V. Flynn
[REDACTED]	1/24/2012	Robin V. Flynn
[REDACTED]	1/25/2012	Robin V. Flynn
[REDACTED]	1/27/2012	Robin V. Flynn
[REDACTED]	2/27/2012	Robin V. Flynn
[REDACTED]	3/20/2012	Robin V. Flynn
[REDACTED]	3/30/2012	Robin V. Flynn
[REDACTED]	4/19/2012	Robin V. Flynn
[REDACTED]	4/24/2012	Robin V. Flynn
[REDACTED]	5/21/2012	Robin V. Flynn Volker Moerbitz

<i><b>Publication</b></i>	<i><b>Date</b></i>	<i><b>Author(s)</b></i>
[REDACTED]	5/25/2012	Robin V. Flynn
[REDACTED]	5/25/2012	Robin V. Flynn
[REDACTED]	6/11/2012	Robin V. Flynn
[REDACTED]	6/13/2012	Robin V. Flynn
[REDACTED]	6/28/2012	Michelle Ow Robin V. Flynn
[REDACTED]	7/13/2012	Robin V. Flynn
[REDACTED]	7/17/2012	Robin V. Flynn
[REDACTED]	8/16/2012	Robin V. Flynn
[REDACTED]	8/21/2012	Robin V. Flynn
[REDACTED]	8/27/2012	Robin V. Flynn
[REDACTED]	8/29/2012	Robin V. Flynn
[REDACTED]	9/26/2012	Robin V. Flynn
[REDACTED]	9/28/2012	Robin V. Flynn
[REDACTED]	10/18/2012	Robin V. Flynn
[REDACTED]	10/24/2012	Robin V. Flynn
[REDACTED]	10/26/2012	Robin V. Flynn
[REDACTED]	11/20/2012	Robin V. Flynn
[REDACTED]	11/27/2012	Robin V. Flynn
[REDACTED]	12/17/2012	Robin V. Flynn
[REDACTED]	12/18/2012	Robin V. Flynn
[REDACTED]	2013	Robin V. Flynn
[REDACTED]	2013	Robin V. Flynn
[REDACTED]	2013	Robin V. Flynn
[REDACTED]	2013	Robin V. Flynn

<i><b>Publication</b></i>	<i><b>Date</b></i>	<i><b>Author(s)</b></i>
[REDACTED]	2013	Robin V. Flynn
[REDACTED]	2013	Robin V. Flynn
[REDACTED]	2013	Robin V. Flynn
[REDACTED]	2013	Robin V. Flynn
[REDACTED]	1/22/2013	Robin V. Flynn
[REDACTED]	1/29/2013	Volker Moerbitz Robin V. Flynn
[REDACTED]	2/21/2013	Robin V. Flynn
[REDACTED]	2/25/2013	Robin V. Flynn
[REDACTED]	2/27/2013	Robin V. Flynn
[REDACTED]	3/12/2013	Robin V. Flynn
[REDACTED]	3/20/2013	Robin V. Flynn
[REDACTED]	3/20/2013	Robin V. Flynn
[REDACTED]	4/15/2013	Robin V. Flynn
[REDACTED]	4/26/2013	Robin V. Flynn
[REDACTED]	5/14/2013	Robin V. Flynn
[REDACTED]	5/28/2013	Robin V. Flynn
[REDACTED]	6/3/2013	Robin V. Flynn
[REDACTED]	6/19/2013	Robin V. Flynn
[REDACTED]	6/20/2013	Robin V. Flynn
[REDACTED]	7/22/2013	Robin V. Flynn
[REDACTED]	7/25/2013	Robin V. Flynn Tony Lenoir
[REDACTED]	7/26/2013	Robin V. Flynn
[REDACTED]	7/29/2013	Tony Lenoir Robin V. Flynn
[REDACTED]	8/7/2013	Robin V. Flynn
[REDACTED]	8/26/2013	Robin V. Flynn
[REDACTED]	9/6/2013	Robin V. Flynn



<i>Publication</i>	<i>Date</i>	<i>Author(s)</i>
[REDACTED]	9/24/2013	Robin V. Flynn Tony Lenoir
[REDACTED]	11/6/2013	Robin V. Flynn
[REDACTED]	11/18/2013	Robin V. Flynn
[REDACTED]	11/21/2013	Robin V. Flynn
[REDACTED]	12/4/2013	Robin V. Flynn
[REDACTED]	12/12/2013	Robin V. Flynn
[REDACTED]	12/16/2013	Robin V. Flynn
[REDACTED]	2014	Robin V. Flynn
[REDACTED]	2014	Robin V. Flynn
[REDACTED]	2014	Robin V. Flynn
[REDACTED]	2014	Robin V. Flynn
[REDACTED]	2014	Robin V. Flynn
[REDACTED]	2014	Robin V. Flynn
[REDACTED]	2014	Robin V. Flynn
[REDACTED]	2014	Robin V. Flynn
[REDACTED]	2014	Robin V. Flynn
[REDACTED]	2/10/2014	Robin V. Flynn
[REDACTED]	2/13/2014	Robin V. Flynn Tony Lenoir
[REDACTED]	2/14/2014	Robin V. Flynn
[REDACTED]	3/6/2014	Robin V. Flynn
[REDACTED]	3/21/2014	Robin V. Flynn Justin Nielson
[REDACTED]	3/24/2014	Robin V. Flynn
[REDACTED]	4/14/2014	Robin V. Flynn

<i><b>Publication</b></i>	<i><b>Date</b></i>	<i><b>Author(s)</b></i>
[REDACTED]	4/28/2014	Robin V. Flynn
[REDACTED]	4/29/2014	Robin V. Flynn
[REDACTED]	4/30/2014	Robin V. Flynn
[REDACTED]	5/7/2014	Robin V. Flynn
[REDACTED]	5/8/2014	Robin V. Flynn
[REDACTED]	5/19/2014	Robin V. Flynn
[REDACTED]	5/27/2014	Robin V. Flynn
[REDACTED]	6/16/2014	Robin V. Flynn
[REDACTED]	6/20/2014	Robin V. Flynn
[REDACTED]	7/14/2014	Robin V. Flynn
[REDACTED]	8/4/2014	Justin Nielson Robin V. Flynn
[REDACTED]	8/14/2014	Robin V. Flynn Justin Nielson Volker Moerbitz
[REDACTED]	8/20/2014	Robin V. Flynn Justin Nielson
[REDACTED]	9/11/2014	Robin V. Flynn
[REDACTED]	9/17/2014	Robin V. Flynn
[REDACTED]	9/24/2014	Robin V. Flynn
[REDACTED]	10/3/2014	Robin V. Flynn
[REDACTED]	10/21/2014	Robin V. Flynn
[REDACTED]	10/30/2014	Peter Leitzinger Robin V. Flynn
[REDACTED]		
[REDACTED]	12/2/2014	Robin V. Flynn
[REDACTED]	12/11/2014	Robin V. Flynn
[REDACTED]	12/18/2014	Chris Young Robin V. Flynn
[REDACTED]	2015	Robin V. Flynn

<i>Publication</i>	<i>Date</i>	<i>Author(s)</i>
[REDACTED]	2015	Robin V. Flynn
[REDACTED]		Robin V. Flynn
[REDACTED]	2015	
[REDACTED]	2015	Robin V. Flynn
[REDACTED]	2015	Robin V. Flynn
[REDACTED]		Robin V. Flynn
[REDACTED]	2015	
[REDACTED]		Robin V. Flynn
[REDACTED]	2015	
[REDACTED]	2/5/2015	Robin V. Flynn
[REDACTED]		
[REDACTED]	2/11/2015	Robin V. Flynn
[REDACTED]		
[REDACTED]	2/18/2015	Peter Leitzinger Robin V. Flynn
[REDACTED]	3/6/2015	Robin V. Flynn
[REDACTED]		
[REDACTED]	3/12/2015	Robin V. Flynn
[REDACTED]		
[REDACTED]	3/27/2015	Robin V. Flynn
[REDACTED]		
[REDACTED]	4/17/2015	Peter Leitzinger Robin V. Flynn
[REDACTED]	5/21/2015	Robin V. Flynn
[REDACTED]		
[REDACTED]	6/17/2015	Justin Nielson Robin V. Flynn
[REDACTED]	7/1/2015	Robin V. Flynn
[REDACTED]		
[REDACTED]	7/7/2015	Robin V. Flynn Mohammed Hamza
[REDACTED]	7/8/2015	Robin V. Flynn
[REDACTED]		
[REDACTED]	8/12/2015	Mohammed Hamza Robin V. Flynn
[REDACTED]	9/3/2015	Robin V. Flynn

<i><b>Publication</b></i>	<i><b>Date</b></i>	<i><b>Author(s)</b></i>
[REDACTED]	9/9/2015	Robin V. Flynn
[REDACTED]	9/21/2015	Robin V. Flynn
[REDACTED]	9/21/2015	Robin V. Flynn
[REDACTED]	9/29/2015	Robin V. Flynn
[REDACTED]	11/2/2015	Robin V. Flynn
[REDACTED]	11/9/2015	Justin Nielson Robin V. Flynn Peter Leitzinger
[REDACTED]	12/14/2015	Robin V. Flynn
[REDACTED]	2016	Robin V. Flynn
[REDACTED]	2016	Robin V. Flynn
[REDACTED]	2016	Robin V. Flynn
[REDACTED]	2016	Robin V. Flynn
[REDACTED]	2016	Robin V. Flynn
[REDACTED]	2016	Robin V. Flynn
[REDACTED]	2016	Robin V. Flynn
[REDACTED]	2016	Robin V. Flynn
[REDACTED]	2/17/2016	Justin Nielson Robin V. Flynn
[REDACTED]	3/3/2016	Justin Nielson Robin V. Flynn
[REDACTED]	3/10/2016	Robin V. Flynn Justin Nielson
[REDACTED]	3/16/2016	Robin V. Flynn
[REDACTED]	3/21/2016	Robin V. Flynn Justin Nielson
[REDACTED]	3/22/2016	Robin V. Flynn Justin Nielson

<i><b>Publication</b></i>	<i><b>Date</b></i>	<i><b>Author(s)</b></i>
[REDACTED]	3/25/2016	Justin Nielson Robin V. Flynn
[REDACTED]	4/21/2016	Justin Nielson Robin V. Flynn Peter Leitzinger
[REDACTED]	4/26/2016	Robin V. Flynn
[REDACTED]	4/27/2016	Robin V. Flynn Justin Nielson
[REDACTED]	6/13/2016	Robin V. Flynn
[REDACTED]	10/14/2016	Robin V. Flynn Justin Nielson
[REDACTED]	11/9/2016	Robin V. Flynn
[REDACTED]	11/28/2016	Robin V. Flynn
[REDACTED]		Robin V. Flynn
[REDACTED]	2017	
[REDACTED]	2017	Robin V. Flynn
[REDACTED]	2017	Robin V. Flynn
[REDACTED]	2017	Robin V. Flynn
[REDACTED]		Robin V. Flynn
[REDACTED]	2017	
[REDACTED]	2017	Robin V. Flynn
[REDACTED]		Robin V. Flynn
[REDACTED]	2017	
[REDACTED]		Robin V. Flynn
[REDACTED]	3/27/2017	Robin V. Flynn
[REDACTED]	4/12/2017	Robin V. Flynn
[REDACTED]	5/25/2017	Robin V. Flynn
[REDACTED]	2018	Robin V. Flynn
[REDACTED]	1/23/2018	Robin V. Flynn Justin Nielson
[REDACTED]	4/17/2018	Robin V. Flynn
[REDACTED]	6/25/2018	Justin Nielson Robin V. Flynn
[REDACTED]	6/27/2018	Robin V. Flynn Peter Leitzinger

<i><b>Publication</b></i>	<i><b>Date</b></i>	<i><b>Author(s)</b></i>
[REDACTED]	2019	Robin V. Flynn
[REDACTED]	7/1/2019	Robin V. Flynn
[REDACTED]	3/31/2020	Robin V. Flynn

***Additional, Unattributed Reports& Publications for Past 10 Years***

<i><b>Publication</b></i>	<i><b>Date</b></i>	<i><b>Author(s)</b></i>
[REDACTED]	11/26/2014	Ali Choukeir
[REDACTED]	6/22/2020	Justin Nielson

**Appendix C: Materials Relied Upon****I. PRODUCED DOCUMENTS**

- [REDACTED]” (Phonorecords III hearing exhibit 546)
- [REDACTED] (*Phonorecords III* hearing exhibit 3007)
- [REDACTED]” (*Phonorecords III* hearing exhibit 2705)
- [REDACTED] (*Phonorecords III* hearing exhibit 2704)
- [REDACTED]” (June 2, 2016) (*Phonorecords III* hearing exhibit 3212)
- [REDACTED] (June 28, 2016) (*Phonorecords III* hearing exhibit 3209)
- [REDACTED] (*Phonorecords III* hearing exhibit 1373)
- [REDACTED] October 2016 (*Phonorecords III* Hearing Exhibit 118)
- [REDACTED], AMZN\_PHONOIV-00000001
- [REDACTED] (*Phonorecords III* Hearing Exhibit 3225)
- [REDACTED] (*Phonorecords III* Hearing Exhibit 113)
- [REDACTED] (*Phonorecords III* hearing exhibit 3056)
- *Webcasting V*, SoundExchange Ex. 064, at SXWEBV\_00004549
- *Webcasting V*, SoundExchange Ex. 6 at PANWEBV\_00004565.
- [REDACTED], GOOG-PHONOIV-00002444
- [REDACTED], SPOT\_P4\_000002079
- [REDACTED], SPOT\_P4\_000001491
- [REDACTED], PAN\_PHONO04\_00000421
- [REDACTED], PAN\_PHONO04\_00000774
- [REDACTED], PAN\_PHONO04\_00000775
- [REDACTED], GOOG-PHONOIV-00003635
- Compendium of Amazon Royalty Data (Mechanical Licensing Collective) (*See* COEX-7.1)
- Compendium of Apple Royalty Data (Mechanical Licensing Collective) (*See* COEX-7.2)

- Compendium of Google Royalty Data (Mechanical Licensing Collective) (*See* COEX-7.35)
- Compendium of Pandora Royalty Data (Mechanical Licensing Collective) (*See* COEX-7.13)
- MLC Rate Report (Mechanical Licensing Collective) (*See* COEX-7.20)
- Spotify Royalty Data (*See* COEX-7.16)

## II. FILINGS/TESTIMONY

- *Phonorecords III*, Barry Written Rebuttal Testimony
- *Phonorecords III*, Gans Written Rebuttal Testimony
- *Phonorecords III*, McCarthy Written Direct Testimony
- *Phonorecords III*, Page Written Direct Testimony
- *Phonorecords III*, Timmins Written Rebuttal Testimony
- *Phonorecords III*, Written Direct Testimony of Marc Rysman
- *Phonorecords III*, Written Rebuttal Testimony of Marc Rysman
- *Phonorecords IV*, Written Direct Testimony of Jeffrey A. Eisenach

## III. HEARING TRANSCRIPTS

- *Phonorecords III* Hearing Transcript (McCarthy)
- *Phonorecords III*, Hearing Testimony (Joyce)
- *Phonorecords III*, Hearing Transcript (Levine)
- *Phonorecords III*, Hearing Transcript (Mirchandani)
- *Phonorecords III*, Hearing Transcript (Page)
- Testimony of Dr. Leslie Marx in *In re Petition of Pandora Media, Inc.*, 12 CV 8035 (DLC), 41 CV 1395 (DLC)

## IV. PUBLIC FINANCIAL DOCUMENTS

- Alphabet 2015 Annual Report
- Alphabet 2020 Annual Report
- Amazon 2014 Q2 Earnings Call
- Amazon 2015 Annual Report



- Amazon 2020 Annual Report
- Apple 2015 Annual Report
- Apple 2018 Annual Report
- Apple 2020 Annual Report
- Apple 2020 Q2 Earnings Call
- Apple 2021 Q3 Earnings Call
- Apple 2021 Q3 Financial Report
- Pandora 2017 Q3 Prepared Remarks
- Pandora 2017 Q4 Earnings Call
- Pandora 2018 Q1 Press Release
- Pandora 2018 Q2 Earnings Call
- Pandora 2018 Q3 Financial Report
- Pandora 2018 Q3 Press Release
- Sirius XM 2019 Q1 Earnings Call
- Sirius XM 2019 Q2 Financial Report
- Sirius XM 2020 Annual Report
- Sirius XM 2021 Q2 Financial Report
- Spotify 2018 Q1 Press Release
- Spotify 2018 Q2 Earnings Call
- Spotify 2018 Q3 Earnings Call
- Spotify 2019 Q1 Financial Report
- Spotify 2020 Q1 Earnings Call
- Spotify 2020 Q2 Earnings Call
- Spotify 2020 Q2 Press Release
- Spotify 2020 Q3 Earnings Call
- Spotify 2021 Q1 Financial Report
- Spotify 2021 Q2 Earnings Call
- Spotify 2021 Q2 Press Release

**V. OTHER DATA AND REPORTS**

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Before the  
COPYRIGHT ROYALTY BOARD  
Library of Congress  
Washington, D.C.

In the Matter of:

DETERMINATION OF RATES AND  
TERMS FOR MAKING AND  
DISTRIBUTING PHONORECORDS  
(Phonorecords IV)

Docket No. 21-CRB-0001-PR (2023-2027)

**WRITTEN DIRECT TESTIMONY OF**

**DANIEL F. SPULBER**

**Expert Witness for Copyright Owners**

**Submitted October 13, 2021**

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**I. QUALIFICATIONS, OVERVIEW OF ASSIGNMENT,  
AND SUMMARY OF CONCLUSIONS**

1. My name is Daniel F. Spulber. I am the Elinor Hobbs Distinguished Professor of International Business and Professor of Strategy at the Kellogg School of Management, Northwestern University, where I have taught since 1990. I am also Professor of Law (Courtesy) at the Northwestern University Pritzker School of Law. I received a Ph.D. in economics in 1979 and a M.A. in economics in 1976 from Northwestern University and a B.A. in economics in 1974 from the University of Michigan. I previously taught at Brown University, the University of Southern California, and Cal Tech. I have served as the Research Director of the Northwestern University Center on Law, Business, and Economics at the Pritzker School of Law. I also served as the founding Director of Kellogg's International Business & Markets Program. I am the founding editor of the Journal of Economics & Management Strategy. I have published fourteen books and numerous articles in leading economics journals and law reviews. I have received 37 research grants, including grants from the National Science Foundation, Qualcomm, the Ewing Marion Kauffman Foundation, and the United States Patent and Trademark Office (USPTO). A copy of my curriculum vitae is attached to this testimony as Appendix A.

2. I have been asked by the Counsel for National Music Publishers' Association and Nashville Songwriters Association International (collectively the "Copyright Owners") to provide expert economic analysis of issues relevant to the determination in this proceeding (the "Proceeding") of royalty rates and terms for making and distributing phonorecords as interactive streams and limited downloads. I will apply economic analysis to consider issues relative to asymmetric information, risk shifting, and pricing of streaming services and implications for royalty rates and the royalty rate structure. Among the documents I have considered are the Determination of Royalty Rates and Terms for Making and Distributing Phonorecords



(*Phonorecords III*) (hereafter “*Phonorecords III* Final Determination”) and the Determination of Rates and Terms for Digital Performance of Sound Recordings and Making of Ephemeral Copies to Facilitate those Performances (*Web V*) (hereafter “*Web V* Determination”), as well as the documents cited herein and cited or listed in my Appendix B, which as noted below, includes my testimony in the *Phonorecords III* Remand proceeding.

3. I submitted Remand Written Rebuttal Testimony in the *Phonorecords III* Remand proceeding (16-CRB-0003-PR (2018-2022) (Remand), which I believe is relevant to my analysis concerning proper rates and terms in this Proceeding, and I therefore attach that testimony and its appendices hereto as Appendix B, and incorporate that testimony as my testimony in this report as well.

4. My economic analysis considers whether the royalty rates and terms proposed by Copyright Owners in this Proceeding “most clearly represent the rates and terms that would have been negotiated in the marketplace between a willing buyer and a willing seller,” which I understand is the standard set forth in the governing statute. Drawing upon my experience and expertise as an economist and based on the facts as I will describe them below, it is my opinion that they do, and that not only is an increase in the royalty rate percentages warranted, but enhanced alternate rate prongs tied to the number of subscribers to or plays by users of the music streaming service, and a “true” or “uncapped” TCC prong, are also necessary particularly given the problems faced by Copyright Owners associated with asymmetric information relative to the companies that operate the music streaming services (such companies, the “Streaming Companies,” and their such streaming services, the “Streaming Services”), and risk shifting from the Streaming Companies to Copyright Owners.

## **II. DISTORTIONS IN ROYALTIES DUE TO ASYMMETRIC INFORMATION**

5. The Copyright Act requires choosing royalty rates and terms based on what a willing buyer and a willing seller would have reached by agreement in a competitive market. The Judges must consider hypothetical negotiations between a Streaming Company and a copyright owner in the absence of a compulsory licensing requirement. Royalty rates and terms should reflect the extent to which the Streaming Service promotes or substitutes for the copyright owner's other revenues. Royalty rates and terms should also account for the relative roles and contributions of the Streaming Company and the copyright owner.

6. The Streaming Companies have information about their businesses that is not available to copyright owners in negotiations (or to Copyright Owners in this proceeding) or to regulators, including information concerning the revenues that are actually being generated across all their business lines by the licensed activity. This information is central to the bargaining dynamic and would, if known by the copyright owners, most likely result in the copyright owners making a bargain that is more favorable to the copyright owners. Asymmetric information refers to the situation in which a party to a transaction has relevant information that is not available to the other party to the transaction. Streaming Companies have information that is central to the bargain and yet not available to copyright owners, and royalty rates and terms that are negotiated in the free market between a willing buyer and willing seller may be impacted in a number of ways by such information asymmetry.

7. Where there is asymmetry of information, negotiated rates and terms will deviate from what the parties would otherwise have negotiated had they both had access to the same information, and they will be tilted in favor of the party with the greater information (which, in

this case, is the Streaming Companies, who possess and control information central to the joint enterprise that is not shared with or available to copyright owners).

8. Consider a pre-Internet example: two parties negotiate over a parcel of land, which we will call Blackacre. Party A, negotiating to purchase Blackacre, has through greater access to technology determined that oil can be mined from Blackacre. Party B, the owner of Blackacre, does not know about the oil. Party A will certainly be able to pay less for Blackacre than it would have to pay if Party B knew about the oil. While an agreement between Parties A and B might appear to be one negotiated between a willing buyer and willing seller – after all, neither was compelled to make the deal – the transaction with asymmetry of information differs from a transaction under full information.

9. Asymmetric information favoring Streaming Companies causes distortions in royalty rates and terms and in the realization of royalties. The Streaming Companies have considerable amounts of information that remain hidden from copyright owners and regulators. The market is now dominated by technology companies with multiple lines of businesses that intersect with the licensed music activity and the customers supplied by those services in multiple ways that are beneficial to the other business lines of these companies. All of the costs, revenues, sources of revenues, data about customers derived from their use of the Streaming Services that are made available to advertisers, and, perhaps most importantly, the long-term value that each customer of the licensed activity supplies to the company as a whole, are hidden from view of the copyright owners and regulators. It is difficult to determine the full extent of the financial benefit provided by the Streaming Services to the other businesses of the Streaming Companies.

10. Apple, Alphabet (Google/YouTube), and Amazon are among the largest companies in the world in terms of market value. The complexity of their businesses means that they have

information about their business activities that are not available to copyright owners and regulators, including the value to those other businesses of the customers they acquire through the licensed activity. Those customers can then be exposed to and sold other goods and services of by these companies (whether such goods and services exist now or in the future), and the future long-term value of these customers increases the present market values of these companies. This makes it difficult, if not impossible, to fairly know the true value of the income produced for the Streaming Companies by the licensed activity. In addition, all of the Streaming Companies can defer and are deferring revenues to the future by heavily discounting and not raising the prices of their Streaming Services to compete for the market and to acquire and retain customers.

11. Streaming Companies also have asymmetric information because they offer product bundles.<sup>1</sup> Streaming Companies offer bundles consisting of many types of products that make it difficult to identify revenues attributable to the music Streaming Service in the bundle, which is particularly problematic where royalties payable for a licensed input are based on streaming revenues. Apple offers bundles consisting of many complementary products and services.<sup>2</sup> Google offers bundles of complementary products including a bundle consisting of

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<sup>1</sup> See Zhu, F. and Liu, Q., 2018. Competing with complementors: An empirical look at Amazon.com. *Strategic Management Journal*, 39(10), 2618-2642.

<sup>2</sup> The company offers bundles it refers to as “Apple One”: “Apple One bundles up to six amazing Apple services into one easy subscription. Get a plan that’s right for you — or for your whole family. And all members have private access to each service, across all their devices. With Apple One, it’s never been easier to get more. For less.” (Apple One, <https://www.apple.com/apple-one/>.) The Apple One bundle combines six services: Apple Music, Apple TV+, Apple Arcade games, iCloud storage, Apple News+, and Apple Fitness+.

YouTube Premium and YouTube Music Premium.<sup>3</sup> Amazon also bundles complementary products in various ways. Amazon bundles through Amazon Prime, which has over 200 million members.<sup>4</sup> Amazon Prime combines the company's various products and services with retail sales through retail shopping discounts, free or discounted shipping, and credit cards. Amazon Prime also bundles streaming and digital products: Amazon Music Prime, Amazon Music Unlimited discounts, Prime video, Prime Video Channels, Prime Gaming, Amazon Photos, and Amazon Kids+ discounts.<sup>5</sup> Amazon also offers a variety of entertainment products that include streaming.<sup>6</sup>

12. Asymmetric information will favor Streaming Companies over copyright owners in multiple ways that impact the determination of royalty rates and terms. Asymmetric information causes problems in regulatory settings because it favors an informed party at the expense of uninformed parties.<sup>7</sup> This makes it difficult for regulators to choose regulatory policies to achieve

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<sup>3</sup> See Ben Moore, August 5, 2021, YouTube Premium vs. YouTube TV: What's the Difference?, PC Mag, <https://www.pcmag.com/how-to/youtube-premium-vs-youtube-tv-whats-the-difference>. Google offers a package that combines Nest and streaming television: "Play music on Nest Audio. Stream movies on your TV with Chromecast. And listen and watch on Nest Hub Max." (Home of Entertainment Package, [https://store.google.com/us/product/home\\_entertainment\\_audio\\_package?hl=en-US](https://store.google.com/us/product/home_entertainment_audio_package?hl=en-US).) Google offers a Google One plan for its mobile phones with shared storage across Google Drive, Gmail, and Google Photos, and discounts in the Google Store. (One membership to get more out of Google, [https://one.google.com/about?utm\\_source=gstore&utm\\_medium=web&utm\\_campaign=subscriptions&utm\\_content=learn\\_more](https://one.google.com/about?utm_source=gstore&utm_medium=web&utm_campaign=subscriptions&utm_content=learn_more)).

<sup>4</sup> Jeffrey P. Bezos, Letter to Shareowners, 2020, <https://ir.aboutamazon.com/annual-reports-proxies-and-shareholder-letters/default.aspx>.

<sup>5</sup> About Amazon Prime Insider & Prime Membership Benefits, [https://www.amazon.com/primeinsider/about?ref=primenav\\_benefits](https://www.amazon.com/primeinsider/about?ref=primenav_benefits).

<sup>6</sup> See Entertainment, <https://www.aboutamazon.com/what-we-do/entertainment> ("We create and provide access to world-class entertainment through Amazon Originals, Prime Video, Audible, Twitch, Amazon Music, Prime Gaming, and more. Amazon's digital entertainment products enable customers to access the latest apps and games, stream or download movies, TV shows, and music, and gives customers the ability to access their own files anywhere in the world.").

<sup>7</sup> Baron, David P. and Roger B. Myerson. "Regulating a monopolist with unknown costs." *Econometrica: Journal of the Econometric Society* (1982): 911-930; Spulber, Daniel F. "Bargaining and regulation with asymmetric information about demand and supply." *Journal of*

efficient outcomes. The regulator will encounter difficulties in reflecting what a willing buyer and a willing seller would have chosen in a competitive market because central information about the activity being licensed in the theoretical negotiation is available to the licensee but not the regulator or the licensor.

13. Streaming Companies may obtain benefits from asymmetric information. Economists refer to a party's benefits from having private information as "information rents."<sup>8</sup> "Information rents" transfer benefits of a transaction from the uninformed party to the informed party. "Information rents" cause distortions in negotiation between a buyer and seller and in contractual relationships between an uninformed principal and an informed agent.<sup>9</sup> "Information rents" also can accentuate differences among market participants, favoring some types of buyers over other buyers or favoring some types of sellers over other sellers, depending on their private information.

14. Asymmetric information distorts the terms of transactions and typically diminishes gains from trade between the parties. The informed party obtains benefits from the information asymmetry that outweigh any losses due to decreased gains from trade. The uninformed party tends to be harmed by the advantages of the informed party and the decreased gains from trade. In some circumstances, problems associated with asymmetric information can be alleviated by the

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<sup>8</sup> Bolton, Patrick, and Mathias Dewatripont. *Contract Theory*. MIT Press, 2005.

<sup>9</sup> *Id.*

informed party sharing information with the uninformed party. Sharing information only occurs if the informed party can obtain additional benefits in return for revealing information. There is no apparent benefit here that would accrue to the Streaming Companies in return for sharing information.

15. Royalties based solely on revenues can also be subject to strategic manipulation. The Streaming Companies have incentives to diminish royalty payments to copyright owners by shifting revenues to other activities. Basing royalties solely on revenues also shifts the costs of business investment to copyright owners because the Streaming Companies decrease prices to compete for the market and/or for acquisition and retention of customers for their other businesses. Cutting prices to build market share, displace competitors and acquire customers for other business lines benefits the Streaming Companies in the long run but harms copyright owners whose royalties are based on the decreased short run revenues.

16. The intent of a royalty rate structure based on sharing revenue is to align the incentives of the parties in maximizing gains from trade. A royalty rate structure based on sharing revenue does not function when either one party has a business incentive not to maximize income or when income is not disclosed fully and thus not properly shared between the parties. The income from the music Streaming Services, which are dominated by large, diversified Streaming Companies, does not show up in the music streaming revenue to be shared. The diversified Streaming Companies can take in income “off the books” of the sharing rule through bundling complementary products and services, operating app stores, providing membership and loyalty programs, and other ways.

17. The Streaming Companies receive the benefits of income in real-time through increases in the value of the equity share in their companies, which reflects the discounted value

of expected future income. Increases in the financial valuation of the company due to streaming music content does not show up as revenues, and is not shared with copyright owners, although this is precisely what the revenue sharing model is supposed to be capturing.

18. Because there is asymmetric information here, there should be an upward bias in setting royalty rates and terms to account for the harm to the copyright owners from the disparity in information. Addressing economic inefficiencies that result from asymmetric information requires both increasing the royalty rate and adjusting the royalty rate structure so that the opacity of revenues attributable to music streaming or the diversion of revenue elsewhere in the ecosystem of the Streaming Companies from the customers they have acquired by offering their (frequently heavily discounted) music Streaming Services do not penalize copyright owners. The incentives effects of asymmetric information, revenue measurement problems, and opportunities for strategic manipulation suggest the need for rate prongs with metrics that provide alternatives to revenues as backstops to a revenue-based structure. Moreover, failing to provide copyright owners with asymmetric information premiums in the form of increased rates leads to market failure, including reduced incentives to create new musical works.

19. The Act's willing buyer/willing seller standard strongly suggests the need to adjust the royalty rate structure. This means adjusting the basis for calculating royalties. The royalty rate structure must seek to capture additional information to offset the information asymmetries and the income earned by the Streaming Companies "off the books" of the royalty rate structure in order to satisfy the willing buyer/willing seller standard. This can be accomplished in part with alternative rate prongs, discussed below.



### **III. DISTORTIONS IN ROYALTIES DUE TO RISK SHIFTING**

20. Royalties based solely on revenues also improperly shift risks from diversified Streaming Companies to copyright owners whose royalties are suppressed and lead to market failure. This is also particularly economically inefficient because the costs of bearing risk will be greater for copyright owners than for the diversified Streaming Companies. The diversified Streaming Companies can mitigate some of the effects of risk because they are so large and because they are diversified. Moreover, the Streaming Companies make all of the decisions about their Streaming Service offerings.

21. Put differently, copyright owners provide costly insurance to Streaming Companies at low cost to those companies. Willing sellers in an effectively competitive market would be expected to insist upon additional compensation for the insurance that they provide to such companies. Including subscriber and play-based rate prongs, as well as a “true” TCC prong, would help reduce the effects of risk shifting and stabilize royalties.

22. Compulsory royalties for copyright owners should include a premium to compensate for shifting risk from Streaming Companies to copyright owners. This would help address the cost to copyright owners of being compelled to involuntarily bear additional risk. This would also not place undue burden on Streaming Companies because they benefit from shifting risk to copyright owners and benefit as well from the low cost acquisition of customers they then sell other goods and services to without having to share the collateral revenue produced by the customers acquired from their music Streaming Services. The Streaming Companies are well positioned to handle risk because of their size and diversification.

23. Alternative rate prongs help to satisfy the willing buyer/willing seller standard by mitigating the effects of risk shifting resulting from royalties based solely on revenues.

**IV. THE ROYALTY RATE STRUCTURE SHOULD INCLUDE ALTERNATIVE RATE PRONGS, INCLUDING A USER PRONG, A PLAY PRONG AND A “TRUE” TCC PRONG**

**A. The Rate Structure Should Include Rate Prongs That Measure Both Subscribers and Plays**

24. To improve accuracy and transparency, the royalty rate structure should factor in the number of subscribers and play measures. Having rate prongs that are predicated on the number of subscribers and their usage addresses the way that music is provided by Streaming Companies. This approach also most closely reflects the way that music is consumed by final users. Adjusting the rate structure to include as a factor the number of subscribers to and plays on Streaming Services would generate more information that would offset the benefits Streaming Companies derive from asymmetric information. These adjustments to the rate structure also -would serve to more closely align the royalty obligation of the Streaming Companies with the interests they pursue and the benefits that they seek from their customers, including engagement, which serves the goal of retention, and maximizing the number of customers brought by music streaming to their ecosystems.

25. Streaming Companies that offer both a subscription service and an ad-supported service will serve customers in two groups – those who opt to pay a monthly subscription fee and therefore can stream music at no additional cost (besides the opportunity cost of their time) and those who must listen to advertising to stream music (and thus pay the opportunity cost of their time and the cost of listening to advertisements). Users can opt into whichever of the two offerings is most appealing. The Streaming Companies offer ad-supported services to increase the total number of users in their ecosystems (but also to obtain detailed data about their users to sell to advertisers).

26. The numbers of users in the two categories depends on the amount of advertising on the ad-based service and the subscription price of the Streaming Service. Because of this, and because of the different mechanism for monetization of subscription and ad-supported users, total revenues for a streaming service are not proportional to total users in a straightforward way. Revenues on the ad-supported service depend on usage and not simply the number of users.

27. When a Streaming Company offers both a free service and a subscription service, streaming revenues depend on a combination of usage and the number of users. Revenues are based on the usage of users in the ad-supported service and the number of subscriptions on the paid service. The numbers of users in the two categories may vary over time as advertising levels and subscription prices change.

28. A Streaming Company will ordinarily choose advertising levels and subscription rates to maximize its overall, long-run company profits. Usage and users are interconnected by user choices between free and premium services. Usage and users are therefore interconnected by the amount of advertising and subscription rates for premium services. Accordingly, it is not possible to consider either total usage of a Streaming Service or the total number of users of a Streaming Service in isolation.

29. In an industry with both access and usage charges, it need not be efficient to choose usage charges equal to marginal costs. If the marginal cost of providing a Streaming Service is equal to zero, it does not follow that a Streaming Company should apply only a subscription fee without any usage charges.

30. The need for usage charges arises because an increase in the subscription fee could result in a decrease in the number of subscribers to the premium service by shifting some users to an ad-supported service. An increase in the subscription fee shifts subscribers toward the free

service that depends on metering usage. A Streaming Company would consider the trade-off between the per-user fees for the premium service and usage-based advertising for the free service.

31. A firm may choose to apply both a per-user charge and a usage charge if they can charge for access and meter usage. This is known as a “two-part tariff” and is a form of “second-degree” price discrimination.<sup>10</sup> The profit-maximizing two-part tariff can involve a positive per-user charge as well as a usage charge in excess of marginal cost.<sup>11</sup>

32. It has been suggested that a greater-of royalty rate is inconsistent with economically efficient pricing.<sup>12</sup> This argument is based on the assertion that because the physical cost of an additional stream is zero, efficient pricing consists of an up-front fee and a zero usage fee.<sup>13</sup> The argument would suggest relying on subscription fees rather than usage fees as a means of emulating efficient pricing. The economics literature shows that a monopolist can have an

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<sup>10</sup> Oi, Walter, 1971, A Disneyland dilemma: Two part tariffs for a Mickey Mouse monopoly, *Quarterly Journal of Economics* 85,77-96; Ng, Y. and W. Weisser, 1974, Optimal pricing with a budget constraint - the case of the two part tariff, *Review of Economic Studies* 41, 337-345; Murphy, M., 1977, Price discrimination, market separation, and the multipart tariff, *Economic Inquiry* 15, 587-599; Mitchell, B., 1978, Optimal pricing of local telephone service, *American Economic Review* 68, 517-537; Damus, S., 1981, Two part tariffs and optimum taxation: The case of railway rates, *American Economic Review*, March, 65-79; Shaffer, Sherrill. “Efficient two-part tariffs with uncertainty and interdependent demand.” *Journal of Economics and Business* 44, no. 4 (1992): 325-334.

<sup>11</sup> Littlechild, S.C., 1975, “Two- Part Tariffs and Consumption Externalities.” *Bell Journal of Economics*, Vol. 6, Autumn, pp. 661-670; Schmalensee, Richard., 1981, Monopolistic two part pricing arrangements, *Bell Journal of Economics* 12, 445-465; Auerbach, A. and A. Pellechio, 1978, The two-part tariff and voluntary market participation, *Quarterly Journal of Economics*, Nov., 571-587; Vettas, N., 2011. Two-part tariffs. In: Durlauf, S. N. and L. E. Blume (Eds.), *The New Palgrave Dictionary of Economics Online*, Macmillan, Palgrave.

<sup>12</sup> *Phonorecords III* Final Determination (Dissent), at 47 (“Moreover, as noted *supra*, the marginal physical cost of an additional stream is zero, so it is economically inefficient to marry a per play fee to a per user fee in a *greater of* approach. Cf. Leonard 3/15/17 Tr. 1122-23 (Leonard) (efficient pricing would utilize an up-front fee and a zero per play fee thereafter).”).

<sup>13</sup> *Id.*

incentive to employ two-part, multi-part, or nonlinear pricing. The economics literature also shows that competing firms can have incentives to employ two-part, multi-part, or nonlinear pricing. As the economics literature demonstrates, usage charges can be greater than marginal cost for a monopolist and for competing firms.

33. The argument that prices should equal marginal cost can be incorrect for a number of reasons. First, the argument is based on the classic economic assertion that marginal cost pricing is efficient. The argument is that the marginal cost of using a bridge is zero so the price of crossing a bridge should be zero.<sup>14</sup> However, zero prices will not finance the bridge because there are fixed costs of building the bridge. How will the bridge be financed if there are no revenues from usage? As William Vickrey points out: “One of the leading objections to the marginal-cost pricing policy for decreasing-cost industries is that the admitted necessity for a subsidy leaves no simple and obvious test of whether or not the project is worthwhile as a whole.”<sup>15</sup> Ronald Coase objects to government subsidies because of inefficiencies in the allocation of inputs, the redistribution of income that results from subsidies and taxes, and distortions from taxation.<sup>16</sup> Martin Feldstein

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<sup>14</sup> Ekelund Jr, Robert B. “Jules Dupuit and the early theory of marginal cost pricing.” *Journal of Political Economy* 76, no. 3 (1968): 462-471, Hotelling, Harold. “The General Welfare in Relation to Problems of Taxation and Railway and Utility Rates,” *Econometrica*, Vol. VI (1938).

<sup>15</sup> Vickrey, William. “Some objections to marginal-cost pricing.” *Journal of Political Economy* 56, no. 3 (1948): 218-238, at 218.

<sup>16</sup> Ronald Coase, 1946, “The Marginal Cost Controversy,” *Economica*, Aug. 13, 169- 82 (“My objections to this solution as compared with adopting a two-part system of pricing fall under three heads: first, that it leads to a maldistribution of the factors of production between different uses; second, that it leads to a redistribution of income; and third, that the additional taxation imposed will tend to produce other harmful effects.”).

observes that “marginal cost pricing in a two-part tariff has been criticized because the fixed price part (A) is essentially a regressive head tax.”<sup>17</sup>

34. Pricing Streaming Services efficiently does not imply the need for a subscription fee with zero usage prices. A Streaming Company incurs fixed costs of operating the Streaming Service as well as management costs and other overhead costs. Economic analysis of pricing can be applied whether the Streaming Service has positive or zero usage costs, that is, costs per play. Economic analysis shows that two-part pricing can be socially efficient because of the distortions caused by recovering all costs from the fixed fee. The economic analysis of two-part pricing shows that a profit-maximizing monopolist may choose two-part pricing with both a positive subscription fee and usage fees greater than marginal cost. The economic analysis of two-part pricing also shows that competing firms can choose positive subscription fees and usage prices greater than marginal costs.

**B. The Rate Structure Should Include A “True” TCC Rate Prong, But Alone It Is Insufficient As An Alternative Rate Prong**

35. The Final Determination in *Phonorecords III* states: “For licensing of musical works for all service offerings, the all-in rate for performances and mechanical reproductions shall be the greater of the percent of service revenue and Total Content Cost (TCC) rates in the following table.” “Total Content Cost” is the amount that a service pays record labels for licenses to reproduce and distribute streams of sound recordings on interactive services. 37 CFR § 385.2.

36. A “true” TCC prong can help protect against revenue deferral or displacement, that is, keeping prices low and failing to maximize revenues realized from the music Streaming Service in service of competition for the market (or the acquisition of customers for the ecosystems of the

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<sup>17</sup> Feldstein, Martin, 1972, Equity and efficiency in public pricing, *Quarterly Journal of Economics* 86, 175-187.

Streaming Companies), in the hopes of; (i) generating greater future revenues by driving out competitors or (ii) acquiring and retaining as many customers as possible who entered the company's ecosystem to access the music Streaming Service and who can now be exposed to and sold goods and services both related and unrelated to the music Streaming Service. According to the Judges:

an uncapped TCC prong effectively imports into the rate structure the protections that record companies have negotiated with services to avoid the undue diminution of revenue through the practice of revenue deferral. The Judges find that the present record indicates that the Services do seek to engage to some extent in revenue deferral in order to promote their long-term growth strategy. A long-term strategy that emphasizes scale over current revenue can be rational, especially when a critical input is a quasi-public good. Growth in market share and revenues is not matched by a commensurate increase in the cost of such inputs, whose marginal cost of production, or reproduction as in this case, is zero. It appears to the Judges that the nature of the downstream interactive streaming market, and its reliance on scaling for success, results necessarily in a competition *for the market* rather than simply competition *in the market*. Revenue deferral argues against adopting a pure percent-of-revenue rate structure.<sup>18</sup>

37. The TCC prong assumes that the record labels will, in an arm's length negotiation, protect themselves from some of the asymmetric information effects by obtaining some assured minimum payment (such as a per subscriber minimum that correlates to a revenue percentage) in a "greater of" structure (or will otherwise obtain some payment assurance). The TCC prong must be sufficiently high to overcome the effects of asymmetric information and it must be a "true," i.e., an "uncapped" TCC, and serve in a "greater of" structure or else it provides no such protection. A "true" TCC prong will limit incentives to understate revenues or at least limit the effects of understating revenues. A "true" TCC prong will limit advantages that Streaming Companies would obtain from asymmetric information about their revenues.

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<sup>18</sup> *Phonorecords III* Final Determination, at 36 (emphasis in original).

38. A “true” TCC prong can also be useful in addressing problems due to regulatory lag.<sup>19</sup> In the present context, the royalty rates will be in effect until 2027, a period of five years. Market agreements made by labels are typically for two years or less. The evidence in this case will come from 2021 and earlier years. The resulting rates thus will be based on data that, by the last year of the period, will be at least six years old.

39. While a “true” TCC imports some protection of an unregulated market negotiation, it is not, alone, sufficient as a protection because the record labels have different incentives than those of songwriters. Unlike songwriters and publishers, record labels and recording artists receive promotional benefits that may help drive their own collateral revenues from concerts, sponsorships and merchandise sales that are not available to songwriters and publishers, whose income is derived solely from the streams of income generated by songs. These benefits may not be captured in TCC. Moreover, the effectiveness of the TCC is reduced or eliminated if the Streaming Company owns the sound recording, and the current Streaming Companies are more than able to acquire sound recording assets, a practice that may become prevalent over time.

40. As I have said, asymmetric information makes it difficult, if not impossible, to satisfy the willing buyer/willing seller standard without broad and effective rate prong alternatives to revenue sharing. Alternative rate prongs are necessary to attempt to limit the effects of asymmetric information regarding the amount of revenues and sources of revenues of the Streaming Companies, especially those revenues that are diverted to those companies’ other

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<sup>19</sup> For regulated utilities, regulatory lag refers to the situation in which “the rates allowed by public utility commissions presumably reflect the anticipated costs of service, at least in forward test year jurisdictions.” Kolb, Robert W., Roger A. Morin, and Gerald D. Gay. “Regulation, Regulatory Lag, and the Use of Futures Markets.” *The Journal of Finance* 38, no. 2 (1983): 405-418., at 405.



business lines through the customers acquired through the music streaming services. This makes it difficult to craft a royalty rate that reflects effective competition.

41. Alternative rate prongs help to satisfy the willing buyer/willing seller standard by providing an approximation to the market price of recorded music. TCC reflects bargaining between Streaming Companies and record companies in a competitive market but, as noted, it is an incomplete backstop because there are incentives and financial considerations that flow to the benefit of record labels and artists that are not reflected in the TCC, as well as the potential of loss of TCC protection to the extent that the service owns the sound recordings.

## **V. THE ROYALTY RATE STRUCTURE AND THE “GREATER-OF FORMULA”**

42. The economic analysis in this section demonstrates why the “greater-of” formula for the royalty rate structure is fair and equitable and improves economic efficiency and guards against market failure. The preceding analysis shows that plays and users of a streaming service are interconnected. This implies the necessity of considering both the level of usage and the total number of users of a streaming service in alternative rate prongs that are in a greater-of formula. The combination of the level of usage and the total number of users should be applied to determine compulsory royalty rates.

43. Intellectual Property including patents, trademarks, copyrights and trade secrets (“IP”) involves assets with some market value. IP owners may choose to transfer or license these assets in the marketplace. Licensing copyrights to Streaming Services allows those companies to offer content in return for royalties paid to copyright owners.

44. It has been stated that when a per user rate “is inserted into a greater-of rate formula – where the access value is supplanted by the per play value, and vice versa– the pricing resembles

a game of ‘heads I win, tails you lose.’”<sup>20</sup> The greater-of rate formula does not give an advantage to copyright owners at the expense of Streaming Companies. The main reason to apply such a greater-of formula is because the Streaming Companies benefit from asymmetric information and, as the Judges found, are engaged in revenue deferral strategies. The Streaming Companies also are engaged in customer acquisition and retention strategies for the benefit of other areas of their businesses. Streaming Companies have information about revenues, the number of users, the extent of usage, how their customers engage, and what other goods and services their customers purchase or use that are in their ecosystems. This information is not shared yet it impacts the calculation of royalties for copyright owners.

45. Streaming Companies also have an advantage over copyright owners because they control the amount of advertising, the subscription prices and the discounts they offer. In contrast, copyright owners have no control or even any input into any of these decisions but their revenue-based royalties are subject to every one of these things. Streaming Companies can defer revenue by reducing the prices of subscriptions or offering discounts associated with the purchase of other goods and services. Streaming Companies can affect the relative numbers of users of their free and premium services by discounting, by determining levels of advertising and other actions. In addition, Streaming Companies also control the marketing and sales of their Streaming Service offerings, including the relative efforts to promote free and premium tiers.

46. The greater-of approach to including information on the level of usage and the number of users addresses problems of asymmetric information that favors the Streaming Companies over copyright owners. The greater-of approach with a usage prong and a minimum user/subscriber prong also serves to counter incentives for strategic manipulation by Streaming

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<sup>20</sup> *Phonorecords III* Final Determination (Dissent), at 47.

Companies. A Streaming Company will be limited in terms of shifting usage or users because the alternative prong will then protect the bargained-for share.

47. Statutory royalties can be based on a Streaming Service's revenues with alternative rate prongs to provide protection against revenue deferment or displacement by the Streaming Company through a per-user/subscriber metric, a per-play metric and a "true" TCC prong. The revenues that a Streaming Company earns from its music Streaming Service, as well as its total content costs, number of users, or level of usage, are subject to the enterprise goals and business models chosen by the Streaming Company. This implies that the resulting royalties will in turn be subject to risk.

48. This has an important implication. Copyright owners provide licenses to Streaming Companies in exchange for future payment of royalties. These royalties, whether based on the revenues, profit, or demand of the Streaming Service, can be characterized as equivalent to risky financial assets. This corresponds a situation in which licensors provide licenses in exchange for risky financial assets. This suggests that applying analytical tools from the field of finance can be helpful in understanding the royalty rate structure.

49. The royalties derived from total usage can be expressed as a constant factor  $m_1$  multiplied by total usage  $Q^*$ ,

$$M_1 = m_1 Q^*.$$

The royalties derived from the total number of users can be expressed as a constant factor  $m_2$  multiplied by the total number of users  $X^*$ ,

$$M_2 = m_2 X^*.$$

Because the two royalties are subject to risk, the pair  $(M_1, M_2)$  constitutes a random vector.<sup>21</sup>

50. The greater-of formula for royalties based on the level of usage and the total number of users or subscribers corresponds to the standard representation in finance of the choice between two risky financial assets,

$$M = \max \{M_1, M_2\}.$$

51. The greater-of formula includes two risky assets: the stream of royalties based on total usage levels and the stream of royalties based on the total number of users. Although applied automatically, it serves to represent the decision of copyright owners regarding realized royalties. Copyright owners will choose the larger of the ways of calculating royalties based on market outcomes.

52. This does not represent a “heads-I-win-tails-you lose” approach because the toss of the coin is not fair. The Streaming Companies control the outcome of the toss of the coin because they have information about the level of usage and the number of uses and because they can manipulate the outcome by exercising control over usage, to some extent, or users/subscribers. Copyright owners have no control over the Streaming Companies’ choices of advertising levels and subscription fees or discounts. The greater-of formula improves fairness because it implicitly offers copyright owners the option of choosing the best outcome out of outcomes over which they exercise no control.<sup>22</sup> This occurs automatically through the calculation of royalties.

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<sup>21</sup> Hürlimann, Werner. “An extension of the Black-Scholes and Margrabe formulas to a multiple risk economy.” *Applied Mathematics* 2, no. 4 (2011): 427.

<sup>22</sup> This recalls the classic notion of fair division, one cuts and then the other chooses. The Streaming Companies control the business model and the enterprise goals that it serves. Fairness suggests that copyright owners then should have the choice in the royalty structure protection (which is functionally equivalent to a greater-of structure, since copyright owners can be presumed to always choose the greater prong.)

53. The greater-of formula corresponds to many common financial arrangements that involve exchange of one risky asset for another.<sup>23</sup> René Stulz states that the “analysis provides an important tool because a wide variety of contingent claims of interest to financial economists have a payoff function which includes the payoff function of a put or a call option on the minimum or the maximum of two risky assets.”<sup>24</sup> A financial option can be written that applies to two or more securities, giving the owner of the option the right to buy either but not both of the securities.<sup>25</sup> This approach can be used to value complex investment projects with more than one stream of cash flows.<sup>26</sup> This approach is used in many incentive and risk-sharing contracts.<sup>27</sup>

54. Financial economists have studied the valuation of the maximum of two risky financial assets.<sup>28</sup> The greater-of formula addresses the exchange of one risky asset for another.<sup>29</sup>

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<sup>23</sup> Stulz, René M. “Options on the minimum or the maximum of two risky assets: analysis and applications.” *Journal of Financial Economics* 10, no. 2 (1982): 161-185.

<sup>24</sup> *Id.*

<sup>25</sup> Cox, John C. and Mark Rubinstein, 1985, *Options Markets*, Prentice Hall, 416.

<sup>26</sup> Stulz, *supra* note 23, at 179 (“The formula for a call option on the maximum of two risky assets can be used to value complex projects in which the firm chooses among various streams of cash-flows at a future date.”).

<sup>27</sup> *Id.*

<sup>28</sup> Johnson, H., 1987. Options on the maximum or the minimum of several assets. *Journal of Financial and Quantitative analysis*, 22(3), pp.277-283; Wu, Xueping, and Jin E. Zhang. “Options on the minimum or the maximum of two average prices.” *Review of Derivatives Research* 3, no. 2 (1999): 183-204; Boyle, Phelim P., and Yiu Kuen Tse. “An algorithm for computing values of options on the maximum or minimum of several assets.” *Journal of Financial and Quantitative Analysis* 25, no. 2 (1990): 215-227; Biger, Nahum, and John Hull. “The valuation of currency options.” *Financial Management* (1983): 24-28; Broadie, Mark, and Jérôme Detemple. “The valuation of American options on multiple assets.” *Mathematical Finance* 7, no. 3 (1997): 241-286.

<sup>29</sup> Margrabe, William. 1978. “The value of an option to exchange one asset for another.” *The Journal of Finance* 33, no. 1: 177-186 (“Some common financial arrangements are equivalent to options to exchange one risky asset for another: the investment adviser’s performance incentive fee, the general margin account, the exchange offer, and the standby commitment.”).

Comparing risky assets arises frequently both in financial markets and in investment decisions made by firms.<sup>30</sup>

55. The greater-of formula can be written informally as the value of holding the asset representing royalties based on total usage with the option of exchanging that asset for royalties based on the total number of users,

$$M = M_1 + \max \{0, M_2 - M_1\}$$

56. The greater-of formula also can be written informally as holding the asset representing royalties based on the total number of users with the option of exchanging that asset for royalties based on the total usage,

$$M = M_2 + \max \{0, M_1 - M_2\}$$

57. The expression  $\max \{0, M_2 - M_1\}$  is the standard way of writing a financial option. It represents the right but not the obligation to exercise an option. Here,  $M_2$  is the value of a risky asset and  $M_1$  is the strike price or exercise price of the option. If the realization of  $M_2$  is greater than  $M_1$  then it is worthwhile to exercise the option and exchange  $M_1$  for  $M_2$ . The difference with standard options is that the strike price or exercise price of the option is itself subject to risk. The same discussion applies to  $\max \{0, M_1 - M_2\}$

58. The well-known Margrabe formula provides a way to calculate the value of the option of exchanging one financial asset for another.<sup>31</sup> Margrabe's analysis offers a method of calculating the value of the financial option  $\max \{0, M_2 - M_1\}$ , where both  $M_1$  and  $M_2$  are risky assets. Margrabe's analysis is a widely cited approach to calculating the value of this type of

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<sup>30</sup> Stulz, *supra* note 23, at 161 (“[A] wide variety of contingent claims of interest to financial economists have a payoff function which includes the payoff function of a put or a call option on the minimum or the maximum of two risky assets.”).

<sup>31</sup> Margrabe, *supra* note 29.

financial option.<sup>32</sup> Margrabe's analysis also makes a significant contribution to the analysis of real options, that is, options encountered in capital investment decisions.<sup>33</sup>

59. The greater-of approach limits incentives for the Streaming Companies to reduce users/subscribers or reduce usage because either strategy would only trigger the protection of the other prong, and it protects copyright owners against the rational business motivations of the Streaming Companies to use the licensed activity to generate revenues for their enterprise that are not shared with copyright owners.<sup>34</sup>

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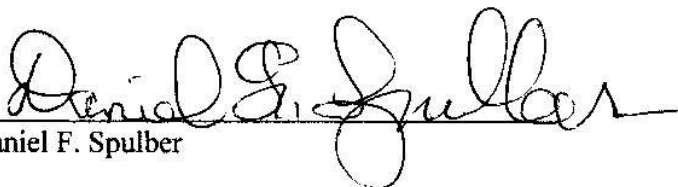
<sup>32</sup> According to Google Scholar, Margrabe's paper has been cited 2,353 times, accessed October 2, 2021. See, for example Duffie, Darrell. *Dynamic Asset Pricing Theory*. Princeton University Press, 2010; Karatzas, Ioannis, Steven E. Shreve, I. Karatzas, and Steven E. Shreve. *Methods of Mathematical Finance*. Vol. 39. New York: Springer, 1998; Björk, Tomas. *Arbitrage Theory in Continuous Time*. Oxford University Press, 2009; Shreve, Steven E. *Stochastic Calculus for Finance II: Continuous-time models*. Vol. 11. Springer Science & Business Media, 2004; Kwok, Yue-Kuen. *Mathematical models of financial derivatives*. Springer, 2008; Geman, Hélyette. *Commodities and Commodity Derivatives: Modeling and Pricing for Agriculturals, Metals and Energy*. John Wiley & Sons, 2009; Jeanblanc, Monique, Marc Yor, and Marc Chesney. *Mathematical methods for financial markets*. Springer Science & Business Media, 2009.

<sup>33</sup> Trigeorgis, Lenos. "Real options and interactions with financial flexibility." *Financial management* (1993): 202-224; Trigeorgis, Lenos. "The nature of option interactions and the valuation of investments with multiple real options." *Journal of Financial and quantitative Analysis* 28, no. 1 (1993): 1-20.

<sup>34</sup> The problem of financial disclosure has been widely studied in economics and finance. The structure of option contracts including debt contracts can provide incentives for disclosure. See Diamond, Douglas W. "Financial intermediation and delegated monitoring." *The review of economic studies* 51, no. 3 (1984): 393-414; Diamond, Douglas W. "Monitoring and reputation: The choice between bank loans and directly placed debt." *Journal of political Economy* 99, no. 4 (1991): 689-721; Gale, Douglas, and Martin Hellwig. "Incentive-compatible debt contracts: The one-period problem." *The Review of Economic Studies* 52, no. 4 (1985): 647-663; Stiglitz, J. and A. Weiss, 1981, Credit rationing in markets with imperfect information, *American Economic Review* 70, 393-410.

I, Daniel F. Spulber, declare under penalty of perjury that the statements contained herein are true and correct to the best of my knowledge, information and belief.

Executed on October 13, 2021 in Wilmette, Illinois.

  
Daniel F. Spulber



## **APPENDIX A**

### **CURRICULUM VITAE**

#### **DANIEL F. SPULBER**

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#### **EDUCATION**

Ph.D., Economics, Northwestern University, 1979  
Dissertation: Studies in Adaptive Investment Planning: Research and Development,  
Rolling Plans and Renewable Resources.

Ph.D. Advisor: Dale Mortensen (Nobel Memorial Prize in Economic Sciences, 2010)

M.A., Economics, Northwestern University, 1976  
B.A., Economics, University of Michigan, 1974

#### **CURRENT PROFESSIONAL APPOINTMENTS**

Elinor Hobbs Distinguished Professor of International Business, Kellogg School of Management,  
September, 2000 to present.

Professor, Strategy Department, Kellogg School of Management, Northwestern University, June  
1, 1990 to present.

Professor of Law, Courtesy, Northwestern University Pritzker School of Law, October 2000 to  
present.

Professor of Managerial Economics and Decision Sciences, Kellogg School of Management,  
Northwestern University, Courtesy, June 1, 1993 to present.

#### **PREVIOUS PROFESSIONAL APPOINTMENTS**

Research Director of the Searle Center on Law, Regulation, and Economic Growth, and  
Northwestern University Center on Law, Business, and Economics at the Pritzker School of  
Law, September, 2010 to June, 2020.

## **APPENDIX A**

Research Director: Program on Innovation, Entrepreneurship, and Economic Growth, Searle Center on Law, Regulation, and Economic Growth, Northwestern University Pritzker School of Law, Fall, 2007 to Fall, 2010.

Founding Director of International Business & Markets Program and Research Center, Kellogg School of Management, Northwestern University, July 2001 to July 2006.

Chair in Energy Resource Management, Kellogg School of Management, Northwestern University, June 1, 1990 to September, 2000.

Visiting Professor of Economics, California Institute of Technology, September, 1989 to December, 1989.

Professor of Economics and Law, University of Southern California Law School, September, 1988 to May, 1990.

Professor of Economics, University of Southern California, September, 1988 to May, 1990.

Visiting Associate Professor of Economics, California Institute of Technology, January, 1988 to June, 1988.

Associate Professor of Economics, with tenure, University of Southern California, September, 1984 to August, 1988.

Research Associate, Institute for Marine and Coastal Studies, University of Southern California, July, 1982 to June, 1984.

Assistant Professor of Economics, University of Southern California, July, 1982 to August, 1984.

Assistant Professor of Economics, Brown University, September, 1978 to June, 1982.

### **AFFILIATIONS AND MEMBERSHIPS**

Member, American Economic Association

Member, The Royal Economic Society

Member, INFORMS, The Institute for Operations Research and the Management Sciences

Member, Expert Network, Vega Economics, <https://vegaeconomics.com/>

## APPENDIX A

Member, The Econometric Society

### EXPERT EXPERIENCE

Spulber has provided expert testimony in oral and written form in matters concerning Antitrust, Intellectual Property (IP), Platforms and Two-sided Markets, Telecommunications, Cable and Satellite Television, Postal Services, Natural Gas, and Network Industries.

Spulber's research has been cited by the Supreme Court of the United States.<sup>1</sup> Spulber's research also has been cited by the Federal Communications Commission.<sup>2</sup>

He has provided expert testimony before the Federal Trade Commission (FTC), the Federal Communications Commission (FCC), the Federal Energy Regulatory Commission (FERC), the International Trade Commission (ITC), the Postal Rate Commission, and state regulatory agencies including the Illinois Commerce Commission (ICC), the California Public Utilities Commission (CPUC), the Indiana Utility Regulatory Commission, the Washington Utilities and Transportation Commission, and the Wisconsin Public Service Commission.

Spulber has testified or prepared written testimony before the Superior Court for the State of California for the County of Los Angeles, the U.S. District Court for the Western District of Texas, and the U.S. District Court for the District of Columbia.

### WEB PAGES

Daniel F. Spulber, SSRN AUTHOR PAGE, 15,424 downloads, Accessed October 10, 2021, [https://papers.ssrn.com/sol3/cf\\_dev/AbsByAuth.cfm?per\\_id=31293](https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=31293)

Daniel F. Spulber, GOOGLE SCHOLAR, 11,924 citations. Accessed October 10, 2021, <https://scholar.google.com/citations?user=Nvs1ixIAAAAJ>

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<sup>1</sup> See 535 U. S. 467 (2002), p. 499, p. 514, p. 534, p. 549, p. 551; 525 U. S. 366 (1999), pp. 426-7.

<sup>2</sup> See for example TARIFF INVESTIGATION ORDER AND FURTHER NOTICE OF PROPOSED RULEMAKING, In the Matter of Business Data Services in an Internet Protocol Environment Investigation of Certain Price Cap Local Exchange Carrier Business Data Services Tariff Pricing Plans Special Access for Price Cap Local Exchange Carriers AT&T Corporation Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services, WC Docket No. 16-143, WC Docket No. 15-247, WC Docket No. 05-25 RM-10593, Comment Date: June 28, 2016 Reply Comment Date: July 26, 2016 Adopted: April 28, 2016 Released: May 2, 2016.

## APPENDIX A

Daniel F. Spulber, IDEAS, Ranked 128<sup>th</sup> among economists by number of journal pages weighted by number of authors, as of September, 2021, Accessed October 10, 2021, <https://ideas.repec.org/top/top.person.anbpages.html>.

Daniel F. Spulber, IDEAS, Abstract views (working papers 12,639, journal articles 26,792), File downloads (working papers 2,760, articles 6,366), Accessed October 10, 2021, <https://logec.repec.org/RAS/psp13.htm>

Daniel F. Spulber, Kellogg School of Management, FACULTY WEBPAGE: [https://www.kellogg.northwestern.edu/Faculty/Directory/Spulber\\_Daniel.aspx](https://www.kellogg.northwestern.edu/Faculty/Directory/Spulber_Daniel.aspx)

Daniel F. Spulber, Northwestern Pritzker School of Law webpage: <https://www.law.northwestern.edu/faculty/profiles/DanielSpulber/>

Daniel F. Spulber, AMAZON AUTHOR PAGE: [https://www.amazon.com/Daniel-F.-Spulber/e/B001ITX7JI/ref=ntt\\_dp\\_epwbk\\_0](https://www.amazon.com/Daniel-F.-Spulber/e/B001ITX7JI/ref=ntt_dp_epwbk_0)

Daniel F. Spulber, PUBLONS profile, <https://publons.com/researcher/2872084/daniel-f-spulber/>

Daniel F. Spulber, Editor, Journal of Economics & Management Strategy (JEMS), <http://editjems.org/>

Journal of Economics & Management Strategy (JEMS) is ranked at 90<sup>th</sup> out of 2,610 journals by IDEAS. Accessed May 16, 2021, <https://ideas.repec.org/top/top.journals.simple.html>.

Journal of Economics & Management Strategy (JEMS) at Wiley Online Library: <https://onlinelibrary.wiley.com/journal/15309134>

JEMS on Twitter: [@jemsjournal](https://twitter.com/jemsjournal)

JEMS Facebook: <https://www.facebook.com/jemsjournal>

TECHNOLOGY – ACADEMICS – POLICY (TAP): <https://www.techpolicy.com/Academics/Dan-Spulber.aspx>

Daniel F. Spulber, <https://www.concurrences.com/en/auteur/daniel-f-spulber>

## COURSES

Sidney J. Levy Teaching Award for excellence in teaching, 1995-1996 academic year.

## APPENDIX A

### **Current teaching:**

International Business Strategy STRT 460 (MBA)

Technology and Innovation, MECS 549-1 (PhD)

Research in Economics, MECS 560-3 (PhD)

### **Other management courses taught:**

Strategy and Organization 460 (MBA)

Public Policy and Management Strategy (MBA and Executive Management Program)

### **Economics courses taught:**

Microeconomic Theory (Undergraduate and PhD)

Law and Economics (Undergraduate and PhD)

Industrial Organization (Undergraduate and PhD)

Regulation (PhD)

Energy and Resource Economics (Undergraduate and PhD)

Environmental Economics (Undergraduate)

### **Law courses taught:**

Regulated Industries

## **JOURNAL EDITING**

Founding Editor, Journal of Economics & Management Strategy, Wiley-Blackwell Publishers, 1991 to present.

Editor, Special issue, Innovation Economics and Technology Standards, Journal of Competition Law and Economics, 2013, 9 (4), Oxford University Press,  
<https://academic.oup.com/jcle/issue/9/4>.

Member, International Advisory Board, Decision, Indian Institute of Management, Springer, 2014 to present.

Member, Advisory Board, Peking University Law Journal, 2012 to present, Taylor & Francis,  
<https://www.tandfonline.com/action/journalInformation?show=editorialBoard&journalCode=rplj>  
[20](#)

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Editorial board, Journal of Strategic Management Education, Senate Hall Academic Publishing, 2004 to present, <http://www.senatehall.com/strategic-management>

Coeditor, Papers and Proceedings of the American Economic Association, American Economic Review, May 1980.

### WORKING PAPERS

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Antitrust Policy and Standard Setting Organizations, Public Domain, Newsletter of the Antitrust Section's (ABA) Intellectual Property Committee, 2018, April, pp. 13-22.

The Future of Patents and the Fork in the Road, IPWatchdog, <http://www.ipwatchdog.com/2015/03/22/the-future-of-patents-and-the-fork-in-the-road/id=55950/>, March 22, 2015.

The Innovation Act Will Harm Income, Employment, and Economic Growth, IPWatchdog, <http://www.ipwatchdog.com/2015/02/24/the-innovation-act-will-harm-income-employment-and-economic-growth/id=55035/>, February 24, 2015, also on Technology/Academics/Policy, <http://www.techpolicy.com/Blog/March-2015/Innovation-Act-Will-Harm-Income,-Employment,-and-E.aspx>, March 4, 2015.

FTC Proposal for Regulating IP Will Harm Consumers, with Richard Epstein and F. Scott Kieff, IPWatchdog, <http://www.ipwatchdog.com/2011/08/11/ftc-proposal-for-regulating-ip-will-harm-consumers/id=18735/>, August 11, 2011.

### GRANTS AND AWARDS (PRINCIPAL INVESTIGATOR)

37. Qualcomm, Research Project, Antitrust Policy toward Patent Licensing, Grant to Northwestern University, FY 2020 and FY 2021, \$572,209.
36. United States Patent and Trademark Office, Research Conference on Innovation Economics, 2020 Conference on Innovation Economics (June, 2020), Grant to Northwestern University, 2020, \$62,830.65 (Cumulative budget to date \$281,523.96).

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35. United States Patent and Trademark Office, Research Conference on Innovation Economics, 2019 Conference on Innovation Economics (June, 2019), Grant to Northwestern University, 2019, \$64,893.
34. Qualcomm, Research Project, Innovation Law and Economics: Public Policy Implications, with Matthew Spitzer, Searle Center for Law, Regulation and Economic Growth, Northwestern University, FY 2018-2019 and FY 2019-2020, \$1,671,155.13.
33. United States Patent and Trademark Office, Research Conference on Innovation Economics, 2018 Conference on Innovation Economics (June 22-23, 2018), Grant to Northwestern University, 2018, \$61,334.
32. United States Patent and Trademark Office, Research Conference on Innovation Economics 2017, Tenth Annual Conference on Innovation Economics (June 22-23, 2017), Grant to Northwestern University, 2017, SP0038417, \$65,846.
31. Ewing Marion Kauffman Foundation, Entrepreneurship Effects of the Sharing Economy: Peer-to-Peer Networks, Mobile Communications, and the Internet of Things, Northwestern University, Summer Research Project, January 1, 2016 – December 1, 2017, \$181,990.
30. United States Patent and Trademark Office, Research Conference on Innovation Economics 2016, Ninth Annual Conference on Innovation Economics (June 23-24, 2016), Grant to Northwestern University, \$45,483.
29. Microsoft, Seventh Annual Conference on Internet Commerce and Innovation, Searle Center on Law, Regulation and Economic Growth, Conference organizer, no PI on grant, 2016, \$60,000.
28. Qualcomm Research Project, Innovation Economics, with Matthew Spitzer, Northwestern University, Grant renewal to Searle Center for Law, Regulation and Economic Growth, FY 2016, FY 2017, and FY 2018, \$3,654,892.
27. United States Patent and Trademark Office, Eighth Annual Conference on Innovation Economics (June 18-19, 2015), Grant to Searle Center for Law, Regulation and Economic Growth, Northwestern University, 2015, \$68,601.
26. United States Patent and Trademark Office, Roundtable on Patents and Technology Standards, April 9-10, 2015, Grant to Searle Center for Law, Regulation and Economic Growth, Northwestern University, 2015, \$47,980, May 14, 2015 to September 30, 2015.
25. Qualcomm Research Project, Innovation Economics: Technology Standards, Market

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- Power, and Public Policy,, with Matthew Spitzer, Grant to Searle Center for Law, Regulation and Economic Growth, Northwestern University, May 1, 2013 to August 31, 2015, \$2.1 million.
24. Ewing Marion Kauffman Foundation, Conference and Research on Intellectual Property and Entrepreneurship, Grant to Searle Center for Law, Regulation and Economic Growth, Northwestern University, December 1, 2012 through September 13, 2013.
  23. United States Patent and Trademark Office, Conference on Intellectual Property and Entrepreneurship, Grant to Searle Center for Law, Regulation and Economic Growth, Northwestern University, December 1, 2012 through September 30, 2013.
  22. Qualcomm Research Project, Searle Center Research Initiative in Innovation: Technology Standards and Market Coordination, with Max M. Schanzenbach, Director Searle Center, Northwestern University, Grant to Searle Center for Law, Regulation and Economic Growth, Research Roundtable February 2013 and Research Conference, June, 2014.
  21. Ewing Marion Kauffman Foundation, Conference and Research on Intellectual Property and Entrepreneurship, Grant to Searle Center for Law, Regulation and Economic Growth, Northwestern University, June 2012 through December 1, 2012.
  20. United States Patent and Trademark Office, Conference and Research on Intellectual Property and Entrepreneurship, Grant to Searle Center for Law, Regulation and Economic Growth, Northwestern University, June 1, 2012 through December 1, 2012.
  19. Ewing Marion Kauffman Foundation, Conference and Research on Intellectual Property and Entrepreneurship, Grant to Searle Center for Law, Regulation and Economic Growth, Northwestern University, July 1, 2011 to December 1, 2012.
  18. United States Patent and Trademark Office, Conference and Research on Intellectual Property and Entrepreneurship, Grant to Searle Center for Law, Regulation and Economic Growth, Northwestern University, July 1, 2011 to December 1, 2012.
  17. Ewing Marion Kauffman Foundation, Entrepreneurship, Investment and Financial Capital: Establishment of Firms, Incentives, and Contracts, Northwestern University, Research Project, May 1, 2011 through December 1, 2012.
  16. Microsoft, Antitrust and Competition in Two-Sided Markets, Northwestern University, Research Project, January 1, 2011 to December 13, 2011.
  15. Ewing Marion Kauffman Foundation, Microeconomic Foundations of Entrepreneurship: Establishment of Firms: Competition, Innovation, and Economic Growth, Northwestern

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University, Research Project, March 1, 2008 through February 28, 2011.

14. Ewing Marion Kauffman Foundation, The Central Role of the Entrepreneur in the Establishment of Firms: A Fundamental Analysis of the Theory of the Firm, Northwestern University, Research Project, February 14, 2006 through July 15, 2008.
13. The Searle Fund, Access to Networks in the United States: Economic and Constitutional Connections, Northwestern University, Research Project, June 2004 to May 2005.
12. The Searle Fund, The Economic Functions of the Firm in the Contemporary Economy and in Economic Development, Northwestern University, Research Project, June 2002 to May 2004.
11. The Searle Fund, The Role of Trust in Private Contracts, Northwestern University, Research Project, Research Project, June 2000 to May 2002.
10. Ameritech Foundation Grant, Competitive Strategy and Shakeouts in Telecommunications, Northwestern University, Research Project, June-August 1995.
9. National Science Foundation, Grant No. SES-90-96205, Sequential Models of Regulation with Limited Commitment, Northwestern University, Research Project, January 1990-June 1992.
8. National Science Foundation, Grant No. SES-86-08115 Project Renewal, Government Regulation and Procurement Under Incomplete Information, University of Southern California, Research Project, July 1987-June 1988.
7. National Science Foundation, Grant No. SES-86-08115, Government Regulation and Procurement Under Incomplete Information, University of Southern California, Research Project, July 1986 to June 1987.
6. Sea Grant, Economic Analysis for Resource Regulation, University of Southern California, Research Project, October, 1983 to October, 1985.
5. National Science Foundation, Grant No. SES-82-19121, Risk Sharing and Retail Inventories, University of Southern California, Research Project, September 1983 to June 1985.
4. National Science Foundation, Grant No. SES-82-09219, Competition and Welfare with Nonlinear Pricing, Project Renewal, University of Southern California, Research Project, August 1982 to January 1984.
3. National Science Foundation, Grant No. SES-81-05852, Competition and Welfare with

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Nonlinear Pricing, Brown University and University of Southern California, Research Project, August 1981 to January 1983.

2. National Science Foundation, Grant No. SES-79-14386, The Economics of Renewable Resource Management, Conference Grant, Brown University, Research Project, October 1979 to March 1981.
1. National Science Foundation, Grant No. SES-79-07201, Stochastic Optimization and Economic Dynamics, Brown University, Research Project, July 1979 to July 1980.

## HONORS

Bayard Wickliffe Heath Memorial Lecture, University of Florida Law School, March 20, 2019.

The 12 Best Papers on Antitrust & the Digital Economy, The Technology Liberation Front, #4 Daniel F. Spulber, "Unlocking Technology: Antitrust and Innovation," 4 (4) Journal of Competition Law & Economics, (2008): 915, 2012, <http://techliberation.com/2012/09/06/the-12-best-papers-on-antitrust-the-digital-economy/>

Ranked 6th in the United States in the listing of top 50 economists by pages published in leading journals, 1984-1993, "Trends in Rankings of Economics Departments in the U.S.: An Update, Loren C. Scott and Peter M. Mitias, Economic Inquiry, v. XXXIV, April, 1996, pp. 378-400.

152<sup>nd</sup> in the world in the listing of top economists by publications in Tom Coupé, "Revealed Performances: Worldwide Rankings of Economists and Economics Departments, 1990-2000," Journal of the European Economic Association, 2004.

Highly ranked for 1979-2003 adjusted appearances in "The Most Frequent Contributors to the Elite Economics Journals: Half Century of Contributions to the 'Blue Ribbon Eight'," J. L. Heck and P. A. Zaleski, Journal of Economics and Finance, 9 Spring, 2006, pp. 1-37.

Listed in Marquis' Who's Who in American Education, 4th Edition, and Marquis' Who's Who In Finance and Industry, 27th Edition.

The Bonser Distinguished Lecture at the Kelley School of Business, Indiana University, "Famous Fables of Economics: Myths of Market Failures," March 27, 2003.

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Maggie Award for Business 2.0 series “10 Driving Principles of the New Economy,” Daniel F. Spulber, 1999, “Clock Wise: Customer Convenience is the Key to e-Commerce; Rule 3: Time,” Business 2.0, Special Supplement, February, pp.15-18.

### CONFERENCES ORGANIZED

33. Daniel F. Spulber, Fourteenth Annual USPTO/Kellogg School of Management, Conference on Innovation Economics, Virtual conference, August 20, 2021.
32. Daniel F. Spulber, Thirteenth Annual USPTO/Kellogg School of Management/Center on Law, Business, and Economics Conference on Innovation Economics, August 27-28, 2020, Virtual conference, [https://www.law.northwestern.edu/research-faculty/clbe/events/innovation/documents/innovation\\_economics\\_2020\\_agenda.pdf](https://www.law.northwestern.edu/research-faculty/clbe/events/innovation/documents/innovation_economics_2020_agenda.pdf)
31. Daniel F. Spulber, Twelfth Annual USPTO/Searle Center Conference on Innovation Economics, Searle Center on Law, Regulation and Economic Growth, June, 2019, [http://www.law.northwestern.edu/research-faculty/searlecenter/events/innovation/documents/2019\\_innovation\\_economics\\_june\\_2019\\_agenda.pdf](http://www.law.northwestern.edu/research-faculty/searlecenter/events/innovation/documents/2019_innovation_economics_june_2019_agenda.pdf)
30. Daniel F. Spulber, Eleventh Annual USPTO/Searle Center Conference on Innovation Economics, Searle Center on Law, Regulation and Economic Growth, June, 2018, [http://www.law.northwestern.edu/research-faculty/searlecenter/events/innovation/documents/searle\\_11th\\_innovation\\_economics\\_2018\\_agenda.pdf](http://www.law.northwestern.edu/research-faculty/searlecenter/events/innovation/documents/searle_11th_innovation_economics_2018_agenda.pdf)
29. Daniel F. Spulber, Sixth Annual Research Roundtable on Patents and Technology Standards, Searle Center on Law, Regulation and Economic Growth, May, 2018, [http://www.law.northwestern.edu/research-faculty/searlecenter/events/roundtable/documents/searle\\_sso\\_patent\\_2018\\_agenda.pdf](http://www.law.northwestern.edu/research-faculty/searlecenter/events/roundtable/documents/searle_sso_patent_2018_agenda.pdf)
28. Daniel F. Spulber, Tenth Annual USPTO/Searle Center Conference on Innovation Economics, Searle Center on Law, Regulation and Economic Growth, June 22-23, 2017. [http://www.law.northwestern.edu/research-faculty/searlecenter/events/innovation/documents/Searle\\_10th%20Annual\\_Innovation\\_Economics\\_2017\\_agenda.pdf](http://www.law.northwestern.edu/research-faculty/searlecenter/events/innovation/documents/Searle_10th%20Annual_Innovation_Economics_2017_agenda.pdf)
27. Daniel F. Spulber, Eighth Annual Conference on Internet Commerce and Innovation, Searle Center on Law, Regulation and Economic Growth, June 8-9, 2017. [http://www.law.northwestern.edu/research-faculty/searlecenter/events/internet/documents/Searle\\_8th\\_Internet\\_Commerce\\_2017\\_Agenda.pdf](http://www.law.northwestern.edu/research-faculty/searlecenter/events/internet/documents/Searle_8th_Internet_Commerce_2017_Agenda.pdf).



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26. Daniel F. Spulber, Fifth Annual Research Roundtable on Patents and Technology Standards, Searle Center on Law, Regulation and Economic Growth, May 4-5, 2017, <http://www.law.northwestern.edu/research-faculty/searlecenter/events/roundtable/>, [http://www.law.northwestern.edu/research-faculty/searlecenter/events/roundtable/documents/Searle\\_Center\\_Patent\\_Roundtable\\_2017\\_Agenda.pdf](http://www.law.northwestern.edu/research-faculty/searlecenter/events/roundtable/documents/Searle_Center_Patent_Roundtable_2017_Agenda.pdf)
25. Daniel F. Spulber, Ninth Annual USPTO/Searle Center Conference on Innovation Economics, Searle Center on Law, Regulation and Economic Growth, June 23-24, 2016, [http://www.law.northwestern.edu/research-faculty/searlecenter/events/innovation/documents/Searle\\_Center\\_9th\\_Innovation\\_Economics\\_2016\\_agenda.pdf](http://www.law.northwestern.edu/research-faculty/searlecenter/events/innovation/documents/Searle_Center_9th_Innovation_Economics_2016_agenda.pdf).
24. Daniel F. Spulber, Seventh Annual Conference on Internet Commerce and Innovation, Searle Center on Law, Regulation and Economic Growth, June 9-10, 2016, [http://www.law.northwestern.edu/research-faculty/searlecenter/events/internet/documents/Searle\\_Center\\_7th\\_Annual\\_Internet\\_Commerce\\_Innovation\\_2016\\_Agenda.pdf](http://www.law.northwestern.edu/research-faculty/searlecenter/events/internet/documents/Searle_Center_7th_Annual_Internet_Commerce_Innovation_2016_Agenda.pdf).
23. Daniel F. Spulber, Fourth Annual Research Roundtable on Patents and Technology Standards, Searle Center on Law, Regulation and Economic Growth, May 5-6, 2016, [http://www.law.northwestern.edu/research-faculty/searlecenter/events/roundtable/documents/Searle\\_Center\\_Technology\\_Standards\\_Roundtable\\_2016\\_Agenda.pdf](http://www.law.northwestern.edu/research-faculty/searlecenter/events/roundtable/documents/Searle_Center_Technology_Standards_Roundtable_2016_Agenda.pdf).
22. Daniel F. Spulber, Eighth Annual USPTO/Searle Center Conference on Innovation Economics, Searle Center on Law, Regulation and Economic Growth, June 18-19, 2015, [http://www.law.northwestern.edu/research-faculty/searlecenter/events/innovation/documents/Searle\\_Center\\_8th\\_Innovation\\_Economics\\_2015\\_agenda.pdf](http://www.law.northwestern.edu/research-faculty/searlecenter/events/innovation/documents/Searle_Center_8th_Innovation_Economics_2015_agenda.pdf).
21. Daniel F. Spulber, Sixth Annual Conference on Internet Search and Innovation, Searle Center on Law, Regulation and Economic Growth, June 4-5, 2015, [http://www.law.northwestern.edu/research-faculty/searlecenter/events/internet/documents/Searle\\_Center\\_6th\\_Internet\\_Search\\_Innovation\\_2015\\_Agenda.pdf](http://www.law.northwestern.edu/research-faculty/searlecenter/events/internet/documents/Searle_Center_6th_Internet_Search_Innovation_2015_Agenda.pdf).
20. Daniel F. Spulber, Third Annual Research Roundtable on Patents and Technology Standards, Data Sets, with Stuart Graham, Cosponsored by the USPTO, Searle Center on Law, Regulation and Economic Growth, April 9-10, 2015, [http://www.law.northwestern.edu/research-faculty/searlecenter/events/roundtable/documents/Searle\\_Center\\_Patents\\_Technology\\_St](http://www.law.northwestern.edu/research-faculty/searlecenter/events/roundtable/documents/Searle_Center_Patents_Technology_St)

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[standards\\_2015\\_Agenda.pdf](#).

19. Daniel F. Spulber, Seventh Annual USPTO/Searle Center Conference on Innovation Economics, Searle Center on Law, Regulation and Economic Growth, June, 2014, [http://www.law.northwestern.edu/research-faculty/searlecenter/events/entrepreneur/documents/Searle\\_Center\\_Seventh\\_Annual\\_Innovation\\_Economics\\_2014\\_agenda.pdf](http://www.law.northwestern.edu/research-faculty/searlecenter/events/entrepreneur/documents/Searle_Center_Seventh_Annual_Innovation_Economics_2014_agenda.pdf).
18. Daniel F. Spulber, Fifth Annual Conference on Internet Search and Innovation, Searle Center on Law, Regulation and Economic Growth, June, 2014, [http://www.law.northwestern.edu/research-faculty/searlecenter/events/internet/documents/Searle\\_Center\\_Fifth\\_Annual\\_Internet\\_Search\\_Innovation\\_2014\\_Agenda.pdf](http://www.law.northwestern.edu/research-faculty/searlecenter/events/internet/documents/Searle_Center_Fifth_Annual_Internet_Search_Innovation_2014_Agenda.pdf).
17. Daniel F. Spulber, Research Roundtable on Software and Business Method Patents, Searle Center on Law, Regulation and Economic Growth, with Emerson Tiller, April 24-April 25, 2014, [http://www.law.northwestern.edu/research-faculty/searlecenter/events/roundtable/documents/Searle\\_Center\\_Software\\_Business%20Method%20Patents\\_Roundtable\\_2014\\_Agenda.pdf](http://www.law.northwestern.edu/research-faculty/searlecenter/events/roundtable/documents/Searle_Center_Software_Business%20Method%20Patents_Roundtable_2014_Agenda.pdf).
16. Daniel F. Spulber, Research Roundtable on Innovation Economics, Searle Center on Law, Regulation and Economic Growth, October, 2013, <http://www.law.northwestern.edu/faculty/programs/searlecenter/events/roundtable/index.html#innovationroundtable>.
15. Daniel F. Spulber, Sixth Annual Conference on Innovation and Entrepreneurship, Searle Center on Law, Regulation and Economic Growth, June 6-7, 2013, <http://www.law.northwestern.edu/searlecenter/conference/entrepreneur/index.html>.
14. Daniel F. Spulber, Fourth Annual Conference on Internet Search and Innovation, Searle Center on Law, Regulation and Economic Growth, June 20-21, 2013, <http://www.law.northwestern.edu/searlecenter/conference/internet/index.html>.
13. Daniel F. Spulber, Research Roundtable on Technology Standards, Innovation, and Market Coordination, Searle Center on Law, Regulation and Economic Growth, February 7-8, 2013, <http://www.law.northwestern.edu/searlecenter/conference/roundtable/#standards>.
12. Daniel F. Spulber, Fifth Annual Conference on Innovation and Entrepreneurship, Searle Center on Law, Regulation and Economic Growth, June, 2012, <http://www.law.northwestern.edu/searlecenter/conference/entrepreneur/index.html>.
11. Daniel F. Spulber, Third Annual Conference on Internet Search and Innovation, Searle

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- Center on Law, Regulation and Economic Growth, June, 2012,  
<http://www.law.northwestern.edu/searlecenter/conference/internet/index.html>
10. Daniel F. Spulber, Book Preview Roundtable, Daniel F. Spulber's The Innovative Entrepreneur, Searle Center on Law, Regulation and Economic Growth, April 26-27, 2012,  
<http://www.law.northwestern.edu/searlecenter/conference/roundtable/#entrepreneurship>
  9. Daniel F. Spulber, Fourth Annual Conference on Entrepreneurship and Innovation, Searle Center on Law, Regulation and Economic Growth, June, 2011,  
<http://www.law.northwestern.edu/searlecenter/conference/entrepreneur/index.html>
  8. Daniel F. Spulber, Second Annual Conference on Internet Search and Innovation, Searle Center on Law, Regulation and Economic Growth, June, 2011,  
<http://www.law.northwestern.edu/searlecenter/conference/internet/index.html>
  7. Daniel F. Spulber, Research Roundtable on Innovation Policy, Intellectual Property, and Entrepreneurship, Searle Center on Law, Regulation and Economic Growth, 2011,  
<http://www.law.northwestern.edu/searlecenter/conference/roundtable/#innovation>
  6. Daniel F. Spulber, Third Annual Conference on The Economics and Law of the Entrepreneur, Searle Center on Law, Regulation and Economic Growth, June, 2010,  
<http://www.law.northwestern.edu/searlecenter/conference/entrepreneur/index.html>
  5. Daniel F. Spulber, First Annual Conference on The Economics and Law of Internet Search, 2010,  
<http://www.law.northwestern.edu/searlecenter/conference/internet/index.html>
  4. Daniel F. Spulber, Second Annual Conference on The Economics and Law of the Entrepreneur, Searle Center on Law, Regulation and Economic Growth, June, 2009,  
<http://www.law.northwestern.edu/searlecenter/conference/entrepreneur/index.html>
  3. Daniel F. Spulber, Book Preview Roundtable, Daniel F. Spulber and Christopher Yoo, Networks in Telecommunications, 2008,  
[http://www.law.northwestern.edu/academics/searle/conference/roundtable/Networks\\_agenda.pdf](http://www.law.northwestern.edu/academics/searle/conference/roundtable/Networks_agenda.pdf)
  2. Daniel F. Spulber, First Annual Conference on The Economics and Law of the Entrepreneur, Searle Center on Law, Regulation and Economic Growth, June, 2008,  
<http://www.law.northwestern.edu/searlecenter/conference/entrepreneur/index.html>
  1. Daniel F. Spulber, Book Preview Roundtable, Daniel F. Spulber's The Theory of the Firm, Searle Center on Law, Regulation and Economic Growth, 2008,

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[http://www.law.northwestern.edu/academics/searle/conference/roundtable/theory\\_agenda.pdf](http://www.law.northwestern.edu/academics/searle/conference/roundtable/theory_agenda.pdf)

### OUTSIDE ACTIVITIES

Daniel F. Spulber, Member of the Jury, 2021 Antitrust Writing Award, Concurrences.

Daniel F. Spulber, 2017, Reviewer for 2018 Kauffman Dissertation Fellows, Ewing Marion Kauffman Foundation.

Daniel F. Spulber, Interview for the Global Antitrust Economics Conference, interviewed by Managing Principal Jeffrey Cohen (Analysis Group).<https://www.eventbrite.com/e/interview-with-daniel-spulber-the-global-antitrust-economics-conference-tickets-26910829014>, Concurrences + Searle Center on Law, Regulation, and Economic Growth at Northwestern Pritzker School of Law, Friday, October 7, 2016, Chicago, IL.

### SELECTED PRESENTATIONS

#### 2021

Keynote Speaker, Licensing Standard Essential Patents and Incentives to Innovate, Conference on Transatlantic Relationships in Innovation Policies: Converging Agendas?, European University Institute, Florence School of Regulation, Communications & Media, Florence, Italy, November 11, 2021, forthcoming.

Book Roundtable, on Zorina Khan's *Inventing Ideas: Patents, Prizes, and the Knowledge Economy*, Oxford University Press, Technology, Innovation, and Intellectual Property Program, Classical Liberal Institute, New York University, October 28, 2021.

Speaker and organizer, Fourteenth Annual USPTO/Kellogg School of Management, Conference on Innovation Economics, Virtual conference, August 20, 2021.

Speaker, Book Roundtable, *The Case for Patents*, by Daniel F. Spulber, Technology, Innovation, and Intellectual Property Program, Classical Liberal Institute, New York University, May 11, 2021.

Speaker, Chief Economist Speaker Series, Antitrust and Innovation Competition, United States Patent and Trademark Office (USPTO), Washington, D.C., April 1, 2021.

Speaker, *The Case for Patents*, Annual conference on Intellectual Property Rights, Intellectual

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Property 2021: New Risks, New Challenges & Emerging Solutions, April 26-28 2021, World IP Forum, <https://www.worldipforum.com/wipf-speakers.php?login=success>.

Speaker, The Case for Patents, Podcast, Mercatus Institute, George Mason University, Washington, D.C., 2021, <https://www.mercatus.org/>.

Speaker, Seminar, “The Case for Patents,” Lazarides Institute, Wilfred Laurier University, Waterloo, Canada, Thursday, March 25, 2021.

Speaker, Panel, Digital Platforms: Innovation, Antitrust, Privacy & the Internet of Things, Center for intellectual Property, Information, and Privacy Law, John Marshall Law School, University of Illinois, Chicago. March 12, 2021.

Speaker, LeadersIP Roundtable, IP, Antitrust and Standards: Have We Reached Global Convergence?, February 2, 2021.

Book Roundtable, Innovators, Firms, and Markets: The Organizational Logic of Intellectual Property by Jonathan M. Barnett, Technology, Innovation, and Intellectual Property Program, Classical Liberal Institute, New York University, January 14, 2021.

### 2020

Speaker, Panel, FRAND and the Automotive Value Chain, SEP2020 Conference, IPWatchdog, November 17, 2020.

Speaker, Panel, AI and IP, Conference, Joint program with the Giles S. Rich Inn, Pauline Newman IP American Inn of Court, October 20, 2020.

Speaker, Panel, The Antitrust IP Interface: How Antitrust Affects IP Implementation, online broadcast at World Intellectual Property Review/ Life Sciences Intellectual Property Review, Newton Media Ltd, Kingfisher House, 21-23 Elmfield Road, Bromley BR1 1LT United Kingdom, October 22, 2020, <https://www.lspnconnect.com/>

Speaker, Panel, Using Data to Inform Policy: Empirical Evidence on SEPs, SSOs and FRAND Royalties, 5G at the Nexus of IP, Antitrust, and Technology Leadership, Eighth Annual Fall Conference hosted by the Center for the Protection of Intellectual Property (CPIP) at Antonin Scalia Law School, George Mason University, Arlington, Virginia. Wednesday, October 7 and Thursday, October 8, 2020.

Speaker, Making IP Markets, IP Licensing Roundtable, Center for the Protection of Intellectual Property (CPIP) at Antonin Scalia Law School, George Mason University, Thursday, September 17<sup>th</sup>, 2020.

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Coauthor speaker, Paper Session, TIM Conversations - Technology Acquisitions, Firm Matching in the Market for Technology: Harnessing Creative Destruction, with Pere Arqué-Castells, University of Groningen, Academy of Management, Vancouver, BC, Canada, August 10, August 7-11, 2020.

Speaker, Panel on Antitrust Issues, Digital Platforms: Innovation, Antitrust, and Privacy, Center for intellectual Property, Information, and Privacy Law, John Marshall Law School, University of Illinois, Chicago, IL, March 13, 2020.

Speaker, Antitrust Policy toward Patent Licensing: Why Negotiation Matters, Sponsored by the National Science Foundation (NSF), 2020 Future of IP Conference, Orlando Florida, February 28, 2020.

### 2019

Speaker, Licensing Standard Essential Patents: What is Fair, Reasonable, and Non-Discriminatory?, Bayard Wickliffe Heath Memorial Lecture, University of Florida Law School, March 20, 2019.

Speaker, Panel on Economics of Intellectual Property, USPTO Conference on Artificial Intelligence: Intellectual Property Policy Considerations, January 31, 2019, USPTO, Alexandria, VA.

### 2018

Speaker, Panel, Session on Competition and Performance: The Role of Technology and Innovation Strategies, Academy of Management, Chicago, IL, August 13, 2018.

Speaker, Panel, Session on Organization Design and Industry Dynamics, Ecosystem Design and Industry Dynamics, Annual Organization Design Conference Chicago, IL, August 12, 2018.

Speaker, Panel, ABA Antitrust Section - IP Committee: Teleconference on Essential Patents and the Agencies – Incentives to Standardize, March 6, 2018.

### 2017

Coauthor presentations of Pere Arqué-Castells and Spulber, Daniel F., The Market for Technology: Harnessing Creative Destruction: Fifth Annual Research Roundtable on Patents and Technology Standards, May 4-5, 2017, Chicago; 7th ZEW/MaCCI Conference on the Economics of Innovation and Patenting, May 9, 2017, Mannheim, Germany; European Policy for Intellectual Property (EPIP) 2017 Conference, September 4-7 2017, Bordeaux, France; Barcelona GSE workshop on the Economics of Science and Innovation, June 15-16, 2017, Barcelona, Spain;

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2017 Intellectual Property Statistics for Decision Makers (IPSDM) conference, November 14-15 in Mexico City; Workshop on challenges of innovation policy, November 24, 2017, Reus, Spain.

Speaker, The Internet of Things: Economic Effects and Public Policy Implications, Cyber-physical Technologies to Enable the Internet of Things, Office of Research Development LINC Series: Launching INterdisciplinary Connections, February 15th, 2017, Cook Hall room 2058, Evanston Campus, Northwestern University.

### 2016

Speaker, Economics of Fostering Innovation and Open Standards in Payment Markets, Federal Reserve Bank of Chicago (FRBC), Chicago Payment Symposium, Chicago, IL, October 12-13, 2016.

Speaker, Panel on “Innovation Economics and New Business Models: Which Consequences for Antitrust Policy?” Global Antitrust Conference, Concurrences Review, Chicago, IL, October 7, 2016.

Speaker, Panel on Patent Holdup, Royalty Stacking, and Standards: Theory and Evidence, Conference on Patent Holdup Theory Implications for The Courts, Government, and the Legislature, Stanford University's Hoover Working Group on Intellectual Property, Innovation, and Prosperity (Hoover IP2), Washington, D. C., October 4, 2016.

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**APPENDIX B**

Before the  
UNITED STATES COPYRIGHT ROYALTY JUDGES  
Library of Congress  
Washington, D.C.

In the Matter of:

Determination of Rates and Terms for Making  
and Distributing Phonorecords  
(Phonorecords III)

DOCKET NO. 16–CRB–0003–PR  
(2018–2022) (Remand)

**REMAND WRITTEN REBUTTAL TESTIMONY OF  
DANIEL F. SPULBER, Ph.D.**

**Submitted July 2, 2021**

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### I. QUALIFICATIONS, OVERVIEW OF ASSIGNMENT AND SUMMARY OF CONCLUSIONS

1. My name is Daniel F. Spulber. I am the Elinor Hobbs Distinguished Professor of International Business and Professor of Strategy at the Kellogg School of Management, Northwestern University, where I have taught since 1990. I am also Professor of Law (Courtesy) at the Northwestern University Pritzker School of Law. I received a Ph.D. in economics in 1979 and a M.A. in economics in 1976 from Northwestern University and a B.A. in economics in 1974 from the University of Michigan. I previously taught at Brown University, the University of Southern California, and Cal Tech. I have served as the Research Director of the Northwestern University Center on Law, Business, and Economics at the Pritzker School of Law. I also served as the founding Director of Kellogg's International Business & Markets Program. I am the founding editor of the Journal of Economics & Management Strategy. I have published fourteen books and numerous articles in leading economics journals and law reviews. I have received 37 research grants, including grants from the National Science Foundation, Qualcomm, the Ewing Marion Kauffman Foundation, and the United States Patent and Trademark Office (USPTO). A copy of my curriculum vitae is attached to this testimony as Appendix A.

2. I have published extensively on the economics and law of Intellectual Property (IP) including my recent book: Daniel F. Spulber, The Case for Patents, 2021, New Jersey: World Scientific Publishing Company. I have also published economics and law articles on complementary oligopoly, also referred to as complementary monopolies, including: Daniel F. Spulber, Antitrust Policy toward Patent Licensing: Why Negotiation Matters, 2021, Minnesota Journal of Law, Science and Technology, Vol. 22, No. 1, pp. 83-161, available at <https://scholarship.law.umn.edu/mjlst/>, and Daniel F. Spulber, Complementary Monopolies and



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Bargaining, 2017, Journal of Law & Economics, Vol. 60, No. 1, pp. 29-74, available at <https://doi.org/10.1086/692586>.

3. I have been asked by the counsel for the National Music Publishers' Association and Nashville Songwriters Association International (together the "Copyright Owners") to review the Written Direct Remand Testimony ("WDRT") of Drs. Michael L. Katz, Leslie M. Marx, and Gregory K. Leonard in this proceeding before the Copyright Royalty Board (the "Board") concerning the Determination of Royalty Rates and Terms for Making and Distributing Phonorecords ("*Phonorecords III*"), and to provide expert analysis in response to economic issues raised therein, and in particular, in response to attacks on the Board's reasoning regarding bargaining theory in economics. A list of the materials that I relied upon in connection with this report is contained in my Appendix B.

4. Drawing upon my experience and expertise as an economist, this statement supports the reasoning of the Board in the Final Determination regarding accepted bargaining theory in economics and the relationship between compulsory mechanical royalty rates and bargained sound recording royalty rates in the music streaming marketplace. On the basis of my economic analysis, this statement provides additional explanations regarding the discussion by the Board of bargaining theory in the Final Determination. In particular, this statement shows the accuracy of the observation by the Board that: "[i]n negotiating those deals both sides will be cognizant of the effect on the Services' content cost of a decision by this body." (Final Determination at 74) The streaming services and record companies recognize the cost of copyright royalties in their negotiations.

5. Based on economic analysis, I explain why streaming services and record companies establish sound recording licensing agreements through negotiation. Streaming services and

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record companies engage in bilateral negotiation because sound recording license agreements are complex contracts that must be adapted to the needs of the parties. The discussion suggests that bargaining plays an important role in sound recording license agreements and affects royalties and other provisions of such license agreements. This important insight helps to evaluate how compulsory mechanical royalty rates will affect market royalties.

6. This statement applies economic analysis of bargaining to show how various economic factors affect the outcome of negotiation of sound recording license agreements. Based on my economic analysis of bargaining, I consider how decisions made by the Board regarding compulsory mechanical royalties affect negotiations for sound recordings. I examine the Nash bargaining framework that is generalized to allow for more than two players. I apply this framework to examine aspects of bargaining when there are two or more streaming services and two or more record companies. I show that there are interconnections in the bilateral negotiation of sound recording licensing agreements when there are multiple pairs of streaming services and record companies. This analysis supports the conclusion of the Board that “Bargaining theory instructs that the services and the record companies will take into account any increase in the statutory royalties that the services must pay.” (Final Determination at 74, n. 138)

7. The economic analysis presented in this statement supports and further explains judgments of the Board on bargaining theory in the Final Determination.

8. The economic analysis presented in this statement expands the bargaining model to allow for multiple streaming services and record companies, and shows that the fundamental conclusions of Professor Watt’s bargaining model, and particularly the Board’s takeaways from that model, are fully preserved even under multi-player modelling.

9. Following is a summary of select conclusions from my analysis:

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- The bargaining theory analysis shows that in any bilateral negotiation between a streaming service and a record company, both sides would be cognizant of the streaming service's compulsory mechanical license royalty costs.
- The bargaining theory analysis shows that, *all other things being equal*, an increase in the compulsory license royalty rate would result in a decrease in net surplus, which would cause the parties who share that surplus to reduce their respective portions.
- The bargaining theory analysis further shows that the allocation of an increase in compulsory license royalty costs will be commensurate with the general allocation of surplus between the streaming service and record company.
- My economic analysis and the analyses of the Services' experts Drs. Katz and Marx demonstrate that record companies do not constitute a complementary oligopoly. Complementary oligopoly is not consistent with the low bargaining power that Drs. Katz and Marx posit for the record companies. Complementary oligopolists by definition have what might be thought of as "more than 100 percent" bargaining power, as they have so much market power that they do not bargain, but rather set their prices without restrictions.
- Under economic theory, complementary oligopoly is not a desired state for even the oligopolists. A core feature of the complementary oligopoly theory is that it causes economic harm to the oligopolists themselves, and is something that all parties would seek to avoid.

## II. STREAMING SERVICES AND RECORD COMPANIES ESTABLISH SOUND RECORDING LICENSE AGREEMENTS THROUGH NEGOTIATION

10. In this section, I discuss how contracts between streaming services and record companies are determined through negotiation. I realize that this may seem to be an obvious fact, but I

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nonetheless spend time laying its economic foundation because this is a very important fact for understanding how established economics instructs us to analyze the resulting licenses and royalties. Economics views transactions that result from negotiations fundamentally differently from how it views transactions that do not result from negotiations.

11. Sound recording license agreements between streaming services and record companies are contracts. As with contracts generally, such agreements involve offer and acceptance, consideration, and promises to perform. Streaming services obtain licenses for sound recordings from record companies, and in return streaming services pay royalties to record companies. Sound recording license agreements have many provisions, such as what recordings will be provided, the term and territory of the license, how royalties will be determined, whether there will be advance payments or guarantees of royalties, how the streaming service will report usage and royalties to the record company, and what auditing rights the record company will have to verify the accuracy of reporting and payment.

12. Streaming services and record companies engage in negotiation to establish sound recording license agreements. Negotiation is necessary because each deal is different. The streaming service and record company negotiate over royalties and other contract provisions to customize the contract to the needs of the two parties. Streaming services have diverse costs, sales, and business models. Record companies differ in terms of their catalogs of recordings and business relationships with performers, costs, business models and promotional activities. This means that different bargaining pairs consisting of a streaming service and record company will have different features that must be addressed by the provisions of the sound recording license agreement.

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13. Streaming services and record companies also negotiate sound recording license agreements because they are complex contracts. Sound recording license agreements address interaction between the parties over time and in a rapidly evolving market. Sound recording license agreements govern contractual performance and payments that can last for multiple years, despite marketplace and business model changes. Sound recording license agreements thus differ from immediate exchange of goods and services, which can involve posted prices or negotiated prices.

14. Sound recording license agreements for interactive streaming also tend to involve negotiation because in most situations both the streaming service and the record company have bargaining power. The bargaining power of record companies reflects in part their unique sound recording catalogs and competition among streaming services. The bargaining power of streaming services reflects the number of their subscribers, brands, and distribution technology.

The Board correctly observed:

As must-have suppliers in an unregulated market, record companies are in a position to walk away from negotiations with the Services and, effectively, put them out of business. That they have not done so demonstrates that it is not in their economic interest to do so. The decline in sales of physical copies and permanent digital downloads, along with the growth of streaming, is a powerful economic motivation for record companies to pursue deals with the Services that ensure the continued survival and growth of the music streaming industry. In negotiating those deals both sides will be cognizant of the effect on the Services' content cost of a decision by this body.

(Final Determination at 74)

15. Negotiation between streaming services and record companies provides industry coordination that helps record companies avoid the problems associated with complementary oligopoly. As I will explain later, market conduct as described by the complementary oligopoly model would lead record companies to choose total royalties that would exceed what a profit-maximizing monopolist would charge. This would make the record companies worse off

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because it would lower profits below what a bundling monopolist would obtain. Such high royalties are harmful to the record companies and to the streaming services as well and would damage the music industry overall. Negotiation avoids these problems by lowering total royalties, which benefits consumers as well as streaming services, record companies, and copyright owners.

16. A streaming service and a record company negotiate the provisions of a sound recording license agreement to maximize their joint benefits and allocate those benefits between them. Negotiation of provisions of the sound recording license agreement accounts for the revenues, non-content costs and content costs to the streaming service and record company.

17. The content costs of the streaming service include the “royalty rates and terms to license the copyrights of songwriters and publishers in musical works made and distributed as physical phonorecords, digital downloads, and on-demand digital streams.” (Final Determination, at 1) The compulsory royalty rate will affect the joint benefits of a sound recording license agreement between a streaming service and a record company. Negotiation of the provisions of the sound recording license agreement, including royalties paid by the streaming service to the record company, will consider the compulsory royalty rate for Copyright Owners.

### **III. THE ECONOMICS OF BARGAINING SUPPORTS THE REASONING OF THE BOARD REGARDING THE RELATIONSHIP BETWEEN THE COMPULSORY RATE AND MARKET ROYALTIES**

18. Consideration of some general principles of the economics of bargaining strongly supports the reasoning of the Board regarding how regulated musical work royalties relate to negotiated royalties in the market for sound recordings. The reasoning of the Board in this regard is robust to many general specifications on the bargaining problem.

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19. There are two main categories of bargaining studies in economics. Studies in the first category specify a set of economically desirable properties for solutions to the bargaining problem. Studies of bargaining problems in this category obtain solutions to the bargaining problem that satisfy these desirable properties. An example of this is the classic Nash study.<sup>1</sup> Studies in this category are useful for better understanding of how efficiency criteria, bargaining power, and disagreement points affect bargaining outcomes.

20. Studies in the second category consider strategic games in which the moves of the players determine bargaining outcomes. These studies are intended to describe how different bargaining situations may affect the outcome of bargaining. An example of this type of study is the classic Rubinstein analysis in which the parties make alternating offers.<sup>2</sup> Then, the outcome of bargaining reflects the patience, preferences, and bargaining costs of the parties involved in the negotiation.

21. Many bargaining studies consider bilateral negotiation. The fundamental Nash and Rubinstein studies are bilateral bargaining models. Other bargaining studies consider situations in which there are more than two players, including multiple player extensions of the Nash and Rubinstein bargaining models.<sup>3</sup>

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<sup>1</sup> See John Nash, The Bargaining Problem, 1950, Econometrica, Vol. 18, pp. 155-62. See also Abhinay Muthoo, Bargaining theory with applications, 1999, Cambridge University Press.

<sup>2</sup> Ariel Rubinstein, Perfect equilibrium in a bargaining model, 1982, Econometrica, Vol. 50, pp. 97-109.

<sup>3</sup> For an extension of the Nash bargaining model to more than two players, see Ehud Kalai, Nonsymmetric Nash solutions and replications of 2-person bargaining, 1977, International Journal of Game Theory, Vol. 6, No. 3, pp. 129-133. For extensions of the Rubinstein bargaining model to more than two players, see Pär Torstensson, An n-person Rubinstein bargaining game, 2009, International Game Theory Review, Vol. 11, No. 01, pp. 111-15, and the references therein.

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22. There are multiple streaming services and multiple record companies.<sup>4</sup> Streaming services and record companies engage in bilateral negotiations to establish sound recording license agreements.

23. The economic analysis of bargaining when there are more than two players provides insights into the music industry. Bilateral negotiations between streaming services and record companies should not be considered in isolation because these negotiations are interconnected. Record companies have the same licensees and streaming services have the same licensors. The economic returns of a streaming service reflect its set of licensors. For example, having additional licensors can potentially increase revenues for a streaming service by providing content that increases consumer demand. The economic returns of a record company will be influenced by its set of licensees. For example, additional licensees might increase or decrease the record company's aggregate royalty earnings, depending on the relative royalty rates and substitution effects between licensees. These interconnections will affect the outcome of bilateral negotiations.

24. The solution to the general Nash bargaining problem specifies a division of gains from trade among streaming services and record companies. The gains from trade between streaming services and record companies depend on their revenues and costs. An increase in the effective compulsory musical works royalty rate will decrease gains from trade between streaming services and record companies. All other things being equal, this will affect the solution to the bargaining problem because it must divide a smaller cake among the same players.

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<sup>4</sup> Dr. Katz identifies five leading record companies or aggregators in his testimony (Warner Music Inc., Sony Music Entertainment, Universal Music Group, the Merlin Network and Orchard Enterprises). (Katz WDRT ¶26)



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25. The economic analysis of bargaining highlights the importance of Pareto Optimality. Pareto Optimality is an important desirable property of bargaining solutions. This is a property of the Nash bargaining solution and generalizations of the Nash bargaining solution. A bargaining solution is said to be Pareto Optimal if there is no other solution that makes one player better off without making another player worse off. If two or more players are dividing a cake of a given size, Pareto Optimality requires that the bargaining solution distribute all of the cake. The total payoffs must equal the size of the cake. So, when the bargaining solution satisfies Pareto Optimality, a reduction in the size of the cake will decrease the total payoffs to the players of the game.<sup>5</sup>

26. When there is a surplus of a given size, the Nash bargaining solution and generalizations specify divisions of the surplus among the players. A reduction in the size of the surplus will affect the allocations resulting from division of the cake among the players. When streaming services and record companies are dividing total revenues net of non-content and copyright costs, an increase in the compulsory license rate will decrease the size of the surplus to be divided through bargaining. This means an increase in the compulsory license rate will decrease the payoffs to the players. If we assume that a record company had bargained for a positive share of surplus (as opposed to operating at cost), then along with an increase in the compulsory license rate, *all other things being equal*, we would expect to see a decrease in sound recording royalty rates.

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<sup>5</sup> The “cake” in bargaining theory is meant to include all of the gains from the trade at issue, regardless of how or when they may manifest. Where the division of surplus involves revenue sharing, the definition of revenue is critical. The definition should capture all gains, whether obtained in cash, in kind or otherwise, in the present or future, in the direct product or in complementary products. If the size of the cake is changed or improperly measured, that can dramatically affect the predicted results.

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27. “All other things being equal” (*ceteris paribus* in Latin), is a central principle for economic modelling. This economic analysis of bargaining highlights an important relationship between two content cost variables. However, that relationship does not exist in a vacuum. Many other variables affect the bargaining situation and, for any given period, the net effect of all of the different variables may be different than the effect of the modelled variable alone. Thus, this economic analysis of bargaining will not assure that a streaming service will not face disruption in the real world for any reason.

28. Dr. Leonard criticizes Professor Watt’s Nash bargaining model for being “overly simplified” and positing a single label and service. (Leonard WDRT ¶¶18, 21) Economic modeling is supposed to simplify the situation in order to distill useful principles and teachings. Dr. Leonard appears to acknowledge this fact, but then claims that Professor Watt’s model engages in inappropriate abstraction away from “central” characteristics of the market. (Leonard WDRT ¶18) However, Dr. Leonard’s subsequent discussion misses the crux of the bargaining analysis, and does not identify true modelling problems given the purpose for which Professor Watt offered the model (namely examining the relationship between two content costs in a bargaining context).

29. Dr. Leonard’s objections appear to reduce to the statement that there are multiple factors that influence the division of surplus and what happens in the marketplace. I see nothing in Professor Watt’s model, or in the Board’s discussion of that model, that is in contradiction with that unremarkable claim. Dr. Leonard’s fixation on the particular output of a “virtual dollar for dollar decrease” in sound recording royalties ignores the “all other things being equal” mandate. Professor Watt’s analysis occurred in early 2017, using data that was sourced by Dr. Marx from 2015 (and criticized by him). Sound recording royalty rates for 2018 through 2022 will be

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influenced by many intervening developments as well, including whether the streaming services have decreased non-content costs or changes in the size or measurement of their revenues. I find none of Dr. Leonard's rhetorical questions and hypothetical complexities to be persuasive against the established economic wisdom of bargaining theory.

30. Dr. Leonard also fails to offer any empirical evidence to show that his possibilities actually changed any results.

31. As my analysis shows, Professor Watt's approach was appropriate for its purpose, and the Board's takeaway was appropriate as well. Dr. Leonard's complaints about Professor Watt's model not including multiple players are shown to be empty. Even if we expand the model to accommodate multiple services and labels, it does not change the basic principles or results.

32. To illustrate this preceding discussion, I consider the generalization of the Nash bargaining solution to more than two players.<sup>6</sup> Index streaming services by  $i = 1, \dots, n$ , where  $n$  is the total number of streaming services. Index record companies by  $j = 1, \dots, m$  where  $m$  is the number of record companies. Let  $M_{ij}$  denote the market payment from streaming service  $i$  to record company  $j$ , where  $i = 1, \dots, n$  and  $j = 1, \dots, m$ .

33. I generalize the Nash bargaining solution further to allow for either symmetric or asymmetric relative bargaining power between streaming services and record companies, where  $\mu$  is a bargaining power parameter that represents the total relative bargaining power of the record companies and  $(1 - \mu)$  represents the total relative bargaining power of the streaming services. The bargaining power parameter is strictly greater than zero and strictly less than one. The measure of total relative bargaining power is not meant to suggest that record companies

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<sup>6</sup> See Kalai (1977).

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cooperate with each other or that streaming services cooperate with each other. For ease of discussion, each streaming service has the same relative bargaining power, and each record company has the same relative bargaining power.

34. Streaming services have bargaining power, in part, because they have direct access to consumers that can be reached with technology and marketing and represent a substantial portion of the revenues of the record labels. The relative bargaining power of an individual streaming service is

$$\frac{1 - \mu}{n}$$

35. Record companies have bargaining power because they provide the unique sound recordings to streaming services that create a core value of the consumer music streaming product. The relative bargaining power of an individual record company is

$$\frac{\mu}{m}$$

36. Each of the relative bargaining powers of the streaming services and the record companies is greater than zero and less than one and all of the relative bargaining powers add up to one.<sup>7</sup>

37. A very useful special case of the general Nash problem involves equal bargaining power for each individual streaming service and each individual record company:

$$\frac{\mu}{m} = \frac{1 - \mu}{n}$$

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<sup>7</sup>  $m \frac{\mu}{m} + n \frac{1-\mu}{n} = 1$

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Then, the value of the industry bargaining power parameter equals the ratio of the number of record companies to the sum of the number of streaming companies and the number of record companies:

$$\mu = \frac{m}{n + m}$$

This is the total relative bargaining power of the record companies.

38. For example, with only one streaming service and one record company, this gives the Nash bargaining power of  $\frac{1}{2}$  for each player. More generally, consider the bargaining power when there are  $m = 12$  record companies and  $n = 6$  streaming services. Then, when each streaming service and each record company have the same bargaining power, the bargaining power parameter equals

$$\mu = \frac{12}{6 + 12} = \frac{2}{3}$$

This gives a value for the total relative bargaining power of the record companies.

39. Let  $R_i$  denote the revenue and let  $C_i$  denote the non-content costs of streaming service  $i$ . Also, let  $S_{ij}$  indicate the compulsory license costs streaming service  $i$  incurs that are associated with musical works in sound recordings that were obtained from record company  $j$ . These definitions are for streaming services  $i = 1, \dots, n$ . Finally, let  $K_j$  denote all of the costs of record company  $j$ , again where  $j = 1, \dots, m$ . The streaming service revenue net of non-content costs, the record company content costs, and the content costs for a streaming service are defined for a particular market outcome. The market outcome specifies a given set of customers for each streaming service. To represent a Pareto Optimal outcome, suppose that each streaming service obtains all of the sound recordings available from the record companies.

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40. Consider the bargaining problem with a set of agreements in which every streaming service obtains a sound recording license from every record company. The payments from streaming service  $i$  to record company  $j$  will reflect the underlying revenues, non-content costs, and content costs.

41. In the Nash bargaining problem, the streaming services and record companies have disagreement points equal to zero. It is reasonable to suppose that the disagreement payoff is zero for the streaming service because it cannot operate the shared enterprise without a license. It also is reasonable to suppose that the record company's disagreement payoff is zero because the record company does not obtain any benefit from the shared enterprise when the streaming service is not operating.

42. Given the Nash bargaining framework, the payoffs can be defined as follows. The payoff for a streaming service  $i$  is as follows,

$$P_i = R_i - C_i - \sum_{j=1}^m S_{ij} - \sum_{j=1}^m M_{ij}.$$

The payoff for a record company  $j$  is as follows,

$$W_j = \sum_{i=1}^n M_{ij} - K_j$$

43. The generalized Nash bargaining solution consists of royalty payments  $M_{ij}$ ,  $i = 1, \dots, n$  and  $j = 1, \dots, m$ , that maximize the product of players' net benefits,

$$N = \left[ \prod_{i=1}^n (P_i)^{\frac{1-\mu}{n}} \right] \left[ \left( \prod_{j=1}^m (W_j)^{\frac{\mu}{m}} \right) \right]$$

Maximization generates  $n \cdot m$  equations that determine the values of the  $n \cdot m$  royalties. It can be shown that the Nash bargaining solution solves the following conditions,

$$\frac{\mu}{m} P_i = \frac{1-\mu}{n} W_j$$

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where streaming services are indexed by  $i = 1, \dots, n$  and record companies are indexed by  $j = 1, \dots, m$ . The royalties will depend on the number of streaming services and record companies, the bargaining power parameter, streaming services' revenues and costs, and record companies' costs.

44. To illustrate the solution to the general Nash bargaining problem, suppose that there is symmetry in revenues, content costs, and non-content costs. Then, the royalty payment from each streaming service to each record company satisfies the following condition,

$$\frac{\mu}{m}(R - C - mS - mM) = \frac{1 - \mu}{n}(nM - K)$$

Solving this equation implies that the Nash bargaining solution gives the royalty going from each streaming service to each record company,

$$M = \frac{\mu}{m}(R - C - mS) + \frac{1 - \mu}{n}K$$

This determines the Nash bargaining payoffs of the streaming services and record companies.

45. It follows that a unit increase in the compulsory license cost decreases the royalty paid by a streaming service to a record company by an amount equal to the relative bargaining power parameter  $\mu$ ,

$$\frac{dM}{dS} = -\mu$$

This is the basis of the “see-saw” effect suggesting that, *all other things being equal*, record companies absorb more of an increase in the compulsory rate the greater is their share of the surplus from providing content to the streaming services.

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46. The economics of bargaining reasons that, *all other things being equal*,<sup>8</sup> an increase in the compulsory mechanical royalty rate will be reflected in a reduction in the share of streaming revenues going to record companies and streaming services. The allocation of the loss will depend on the bargaining power parameter. If record companies have high bargaining power, they (all other things being equal) will absorb a greater share of the bargaining surplus in the first place and so will bear a greater burden from an increase in the compulsory rate. If record companies have low bargaining power, they will absorb a lower share of the bargaining surplus in the first place and (all other things being equal) will bear a lower burden from an increase in the compulsory rate. It is inconsistent to argue that record companies have a high relative bargaining power and at the same time to argue that record companies will refuse (all other things being equal) to bear a greater share of the effects of an increase in the compulsory rate. One or the other of these assertions must be the case.

47. Bargaining allocates benefits from exchange between streaming services and record companies. An increase in the compulsory royalty decreases the benefits from exchange. An increase in compulsory royalties  $S$  decreases the surplus from market exchange between streaming services and record companies. The reduction in net benefits is one for one, that is, each unit increase in compulsory royalties is a unit reduction in the benefits of market exchange between streaming services and record companies. The bargaining parameter for any given set of streaming services and record companies determines how the benefits from exchange will be divided. So, the effects of an increase in compulsory royalties  $S$  on market royalties for any set

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<sup>8</sup> I do not here reiterate “all other things being equal” on each proposition, but it should be generally read into economic modelling conclusions or predictions, whether or not the words are repeated in each instance. Economists do not typically repeat these words in each place where they apply, since it would lead to constant repetition.



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of streaming services and record companies depends only on the total relative bargaining power parameter.

48. The effect of an increase in the compulsory rate on the share of streaming revenues going to record companies is between zero and one because the total relative bargaining power parameter is between zero and one. An increase in the compulsory rate will (all other things being equal) be divided evenly between streaming services and record companies if the bargaining power parameter is closer to one half. An increase in the compulsory rate will (all other things being equal) primarily be reflected mostly in a decrease in the record company share if the bargaining power parameter is closer to one. An increase in the compulsory rate will primarily result in lower benefits for streaming services if the bargaining power parameter is closer to zero.

49. To illustrate the implications of the general Nash bargaining problem, recall the earlier example with symmetric bargaining power when there are  $m = 12$  record companies and  $n = 6$  streaming services. Then, the bargaining parameter takes the value  $\mu = 2/3$ . This implies that a \$1 increase in the compulsory royalty will decrease each streaming royalty by approximately \$0.65.

50. An increase in the compulsory royalties  $S$  decreases benefits from exchange. The total benefits from exchange for the streaming services and record companies is

$$B = n(R - C - mS) - mK$$

51. The bargaining solution allocates these benefits and must address the effects of compulsory royalties. This is true in general with differences in streaming services and record companies. This illustrates the conclusion of the Board that streaming services and record

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companies will be cognizant of the effects of compulsory mechanical royalties when they negotiate music licensing agreements.

52. The analysis of the general Nash bargaining problem supports the insight noted by the Board that “sound recording royalty rates in the unregulated market will decline in response to an increase in the compulsory license rate for musical works.” (Final Determination at 73-74) To be clear, such decline due to an increase in the compulsory rate could occur alongside multiple other variables causing increases in sound recording royalty rates, such as decreasing non-content costs or revenues not captured under the revenue definition, and the net result of all simultaneous changes from all variables may *not* be a decline in the sound recording royalty rate.

#### **IV. THE ECONOMICS OF BARGAINING SHOWS THAT THE RECORD COMPANIES ARE NOT A COMPLEMENTARY OLIGOPOLY**

53. Each of the Services’ expert witnesses makes reference to a “complementary oligopoly” among record companies. (*E.g.*, Katz WDRT ¶53; Marx WDRT ¶39; Leonard WDRT ¶13) None of these witnesses provide any economic explanation for how this supposed status changes market outcomes or what it would mean for the compulsory mechanical royalty rate, but each expert witness seems to think that it helps their argument for lower compulsory mechanical royalties. My reading of the Final Determination is that it does in fact account for a large reduction to the royalty rates due to a concern for this same complementary oligopoly. (Final Determination at 73) Given the apparent appeal by the streaming services for changes to the rate structure and rates discounts based on this same concern, I address it below.

54. With respect to the analysis of sound recording royalties in the free market, there are two conflicting views that I will call the complementary oligopoly view and the negotiation view. These two views have different implications for how to analyze sound recording royalties.

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55. The negotiation view recognizes that record companies and streaming services negotiate sound recording license agreements that include royalties and other contract provisions. The complementary oligopoly view, in contrast, asserts that record companies do not negotiate with streaming services but rather dictate royalties through take-it-or-leave-it offers that offer no earnings for streaming services.

56. The analysis in this section concludes that the record companies are not a complementary oligopoly. A complementary oligopoly is said to be subject to the following problem: “[b]y logic first identified by Antoine Cournot in 1838, firms offering complementary products tend to set higher prices than would even a monopoly seller of the same products, illustrating that suppliers of complements do not compete with one another.” (*Web IV* Final Determination, 81 Fed. Reg 26342) The reasoning behind the Cournot model is that each supplier raises their price without regard to the negative effects on the profits of other suppliers, resulting in total prices that are higher than a bundling monopolist and profits that are lower than a bundling monopolist.<sup>9</sup> This problem is known to economists as the “Cournot Effect” or the complements inefficiency problem. Hereafter, I refer to the Cournot model or “complementary monopolies” model as the “complementary oligopoly” model.

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<sup>9</sup> See Antoine Augustin Cournot, Researches Into the Mathematical Principles of the Theory of Wealth, Translated by Nathaniel T. Baker, 1838, 1897, New York: MacMillan; Francesco Parisi and Ben DePoorter, The Market for Intellectual Property: The Case of Complementary Oligopoly in The Economics of Copyrights: Developments in Research and Analysis, 2003 (W. Gordon and R. Watt eds.) (“In the case of complementary duopoly, unlike the traditional case of duopoly over substitute goods, both producer and consumer surplus are diminished compared to the alternative monopoly outcome”).

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57. The “Cournot effect” means that total input prices are greater than what a bundling monopolist would charge.<sup>10</sup> Applying the complementary oligopoly model to the recorded music industry implies that record companies would charge total royalties that are greater than what a bundling monopolist would charge. Because a monopolist maximizes profit, it is apparent that such royalties would cause profits to fall below what a bundling monopolist would obtain. The intellectual property (“IP”) holders are made worse off.<sup>11</sup> Thus, under economic theory, complementary oligopoly is not a desirable state for even the oligopolists.

58. In the Cournot model, with two or more input suppliers, because the total of input prices exceeds the bundled monopoly price, total output and total profit for input suppliers are driven below that of a bundling monopolist.<sup>12</sup> Thus, while the Services seem to posit that the record companies’ alleged complementary oligopoly position is a benefit to the record companies, to the contrary, it is a harmful trap that record companies and other industry participants would seek to avoid.

59. The complementary oligopoly model predicts that the total prices required by input suppliers exceed the price that a monopolist would charge for the bundle of inputs. The “Cournot Effect” is a type of “free rider problem” because each input supplier is said to choose

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<sup>10</sup> See Daniel F. Spulber, Complementary Monopolies and Bargaining, 2017, Journal of Law & Economics, Vol. 60, No. 1, pp. 29-74; Daniel F. Spulber, Antitrust Policy toward Patent Licensing: Why Negotiation Matters, 2021, Minnesota Journal of Law, Science and Technology, Vol. 22, No. 1, pp. 83-161.

<sup>11</sup> Parisi and DePoorter (2003) (“the independent pricing of intellectual property rights from two complementary duopolists likely results in an equilibrium that is worse for both the private parties, and society at large”).

<sup>12</sup> See J.M. Buchanan and Y.J. Yoon, Symmetric tragedies: Commons and anticommons, 2000, The Journal of Law and Economics, Vol. 43, No. 1, pp.1-14; Spulber (2017); Spulber (2021).

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its price for its own benefit without regard to how the resulting increase in the downstream output price will impact other input suppliers. Cournot observes that “the composite commodity will always be made more expensive, by reason of separation of interests than by reason of the fusion of monopolies. On the other hand, an association of monopolists working for their own interest, in this instance will also work for the interest of consumers, which is exactly the opposite of what happens with competing producers.”<sup>13</sup>

60. Economic analysis and empirical evidence establish that the record companies are not a complementary oligopoly. The market institutions surrounding sound recording licensing depart substantially from those of the complementary oligopoly model so that economic analysis does not support application of that model. The complementary oligopoly model is based on assumptions that do not correspond to the market for sound recording licensing. Also, predictions of the complementary oligopoly model do not correspond to the market for sound recording licensing; in particular there is no evidence for the predicted Cournot effect.

61. The complementary oligopoly model assumes that input suppliers do not engage in negotiations but rather make take-it-or-leave-it price offers to downstream producers.<sup>14</sup> Applied to the recording industry, this would imply that record companies do not negotiate but instead make take-it-or-leave-it royalty offers to streaming services. However, the remand witness statements of the streaming services admit that they negotiate sound recording license agreements with record companies, which is contrary to an argument that record companies make take-it-or-leave-it royalty offers to streaming services.

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<sup>13</sup> See Cournot (1838, 1897) at p. 103.

<sup>14</sup> See Buchanan and Yoon (2000); Parisi and DePoorter (2003); Cournot (1838, 1897) at pp. 99-116.

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62. The complementary oligopoly model assumes that input suppliers exercise all of the market power and that downstream producers have no market power.<sup>15</sup> Suppliers choose prices to maximize their individual profit. Downstream producers take the input supply prices as given and also are price takers in the downstream product market. In the sound recording market, this would imply that record companies have all of the market power and streaming services have no market power. Negotiation of sound recording license agreements and other evidence shows, however, that record companies do not have all of the market power.

63. The complementary oligopoly model describes immediate transactions rather than contractual exchange. This does not accurately describe the sound recording license market because streaming services and record companies transact through contractual agreements that, the remand witness statements admit, cover some period of time, typically years.

64. The complementary oligopoly model also assumes that inputs are combined in fixed proportions to produce a final output. In economic terms, inputs are said to be perfect complements. Cournot's model illustrates this with the example that zinc and copper are combined in fixed proportions to produce brass. Inputs are said to be perfect complements if a producer cannot generate any output without using all of the inputs. In other words, output is zero if any one of the inputs is not used. In contrast to the complementary oligopoly model, the sound recording catalogs of record companies are not perfect complements. It is feasible to operate a music streaming service without obtaining every recording from every record company. For example, Amazon's Prime Music has about two million recordings, in contrast to

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<sup>15</sup> See Buchanan and Yoon (2000); Parisi and DePoorter (2003); Cournot (1838, 1897) at pp. 99-116.

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Amazon Music Unlimited, which has about 60 million recordings, according to Rolling Stone.<sup>16</sup> The catalogs of record companies may be imperfect complements or imperfect substitutes.

65. In the complementary oligopoly model, the final price of brass equals the sum of the prices of copper and zinc weighted by the fixed proportions used in production.<sup>17</sup> This means that downstream producers have a zero markup over their unit costs (also assumed to be zero).<sup>18</sup> So, in the complementary oligopoly model, downstream producers have zero market power in the final output market. In the market for streaming of music, this is equivalent to assuming that streaming services have zero market power vis-à-vis their customers in the market for streaming. However, it is evident that streaming services have some ability to vary their prices and attract customers with differentiated product offerings, brand names, and special features (e.g., subscriptions tied to service-branded products). Streaming services obtain earnings from advertising and paid subscriptions, as well as through complementary products and services (such as smart speakers or the exploitation of data acquired from consumers of the streaming service).<sup>19</sup>

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<sup>16</sup> Brandt Ran, We Compared Popular Music Streaming Services — These Are the Three You Should Check Out, Rolling Stone (March 12, 2021), available at <https://www.rollingstone.com/product-recommendations/electronics/best-music-streaming-services-compared-1011378> (“Prime Music has all of the major features I mentioned above with one caveat: its library ‘only’ has a couple of million tracks. For reference, the company’s paid music subscription service Amazon Music Unlimited gives you access to a library of 60 million songs.”).

<sup>17</sup> Cournot (1838, 1897) at p. 100.

<sup>18</sup> *Id.*

<sup>19</sup> See RIAA, 2020 Year-End Music Industry Revenue Report, 2020, available at <https://www.riaa.com/reports/2020-year-end-music-industry-revenue-report/>.

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66. The just-noted assumption that downstream producers have a zero markup over input costs implies that the complementary oligopoly model assumes that downstream producers are perfectly competitive firms that have zero profit. Applied to the music industry, this is equivalent to assuming that streaming services are perfectly competitive and operate with zero profit. Soaring stock market valuations in this industry strongly suggests that streaming services have high net present values of earnings.<sup>20</sup> This is inconsistent with the assumption of zero profits in the complementary oligopoly model.

67. The complementary oligopoly model also assumes that the input suppliers are monopolists in their respective commodities.<sup>21</sup> This does not provide a description of the market for sound recordings. The recordings produced by record companies are IP. As I point out elsewhere: “The many varieties of competition in the market for inventions and related markets refute the common misconception that patents give their owners an economic monopoly.”<sup>22</sup> The same applies to other forms of IP including copyrighted recordings. IP such as copyrights does not confer economic monopolies on copyright owners.<sup>23</sup> IP protections do not create entry barriers into the market for sound recordings. IP protections do not prevent record companies and recording artists from recording new music. The catalogs of recording companies are

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<sup>20</sup> Consider for example the share price history of Spotify on Nasdaq between 2018 and 2021. See Nasdaq.com, “Spotify Technology S.A. Ordinary Shares,” Summary, available at <https://www.nasdaq.com/market-activity/stocks/spot>. (CO Rem. Ex. V).

<sup>21</sup> See Cournot at pp. 100-101.

<sup>22</sup> Daniel F. Spulber, How Patents Provide the Foundation of the Market for Inventions, 2015, Journal of Competition Law and Economics, Vol. 11, No. 2, pp. 271-316; see also Edmund W. Kitch, Elementary and Persistent Errors in the Economic Analysis of Intellectual Property, 2000, Vanderbilt Law Review, Vol. 53, p. 1727.

<sup>23</sup> Kitch (2000) at p. 1727.



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collections of copyrighted sound recordings. These music catalogs cannot be characterized as monopolized commodities. Because, as noted above, complementary oligopoly is not beneficial to input suppliers, record companies would seek to and do in fact engage in negotiation of sound recording license agreements with streaming services.

68. In particular, recall that negotiation between streaming services and record companies generates a Pareto Optimal outcome. No party to the negotiations can be made better off without making another party worse off. In contrast, the predicted complementary monopolies outcome is not Pareto Optimal. This is because the predicted total royalties are said to be greater than what a bundling monopoly would charge. All record companies could be made better off by lowering the total of royalties at least down to the bundled monopoly level, because then total royalties would generate the greatest amount of profit. Lowering royalties would also make all streaming services better off. So, the predicted complementary monopolies outcome cannot be Pareto Optimal and so it is inconsistent with negotiation.

69. The assertion that the record companies are a complementary oligopoly is also contradicted by Drs. Katz and Marx, who make assumptions in their remand testimony that the record companies have relatively low bargaining power and the streaming services have relatively high bargaining power. Dr. Marx states directly that her adjustments “would yield a substantially lower bargaining power parameter and thus a substantially lower see-saw effect.” (Marx WDRT, ¶38) Dr. Katz likewise explains that in the economic formulas, the Greek letter  $\mu$  is the bargaining power parameter, and that, “ $\mu$  is also the rate at which the see-saw effect occurs,” and that his adjustments would “lead to even lower estimates of  $\mu$ .” (Katz WDRT, ¶¶123, 136)

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70. In Cournot's model each of the complementary monopolists chooses its individual profit-maximizing price, and receives exactly that price from its buyers. Cournot defines "the demand for each of the component commodities; if we suppose each of these to be handled by a monopolist."<sup>24</sup> Cournot states that "we shall recognize that the values of  $p_1$  and  $p_2$  are determined by the two equations" for profit maximization.<sup>25</sup> As Machlup and Taber observe, in Cournot's analysis: "[e]ither of the complementary monopolists would take note of the price charged by the other, would assume that his own actions would not affect the other's price, and would then set his price in an attempt to maximize his own profit."<sup>26</sup> According to Buchanan and Yoon this is "a game in which each owner tries to maximize her rent by setting the ticket price."<sup>27</sup> Parisi and DePoorter state that "competitive or oligopolistic supply of strict complements would paradoxically lead to higher prices, smaller output, and reduced welfare, compared to an alternative coordinated monopolistic pricing. The monopolist is no longer an endpoint on the spectrum of market models because complementarity pushes duopoly to higher prices and greater quantity restrictions than monopoly."<sup>28</sup>

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<sup>24</sup> Antoine Augustin Cournot, Researches Into the Mathematical Principles of the Theory of Wealth, Translated by Nathaniel T. Baker, 1838, 1897, New York: MacMillan, at pp. 100-01.

<sup>25</sup> Id. at 101.

<sup>26</sup> F. Machlup, F. and M. Taber, Bilateral monopoly, successive monopoly, and vertical integration, 1960, Economica, at p. 104.

<sup>27</sup> J.M. Buchanan and Y.J. Yoon, Symmetric tragedies: Commons and anticommons, 2000, The Journal of Law and Economics, Vol. 43, No. 1, pp.1-14, at p. 9.

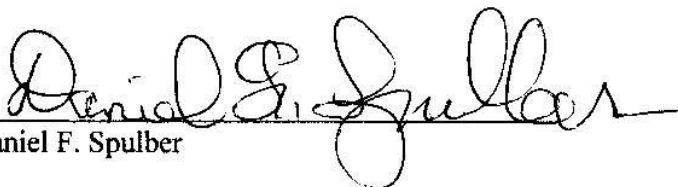
<sup>28</sup> Parisi and DePoorter (2003).

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71. The assertion that the record companies are a complementary oligopoly means that each record company is a monopolist that has very high market power. As complementary oligopolists, their market power is so substantial that they can require streaming services to pay them their individual profit-maximizing prices. The complementary oligopolists then are “price makers,” that is, they choose and receive their individual profit-maximizing prices. There is no haggling or deal making with downstream firms. If the record companies were to operate as a complementary oligopoly, they would impose their individual profit-maximizing prices on streaming services without entering into negotiations with streaming services. If the record companies operated as a complementary oligopoly, the outcome would be inconsistent with record companies having low bargaining power. The record companies would impose their individual profit-maximizing prices on a take-it-or-leave-it basis, suggesting the record companies would have very high bargaining power relative to streaming services.

I, Daniel F. Spulber, declare under penalty of perjury that the statements contained herein are true and correct to the best of my knowledge, information and belief.

Executed on October 13, 2021 in Wilmette, Illinois.

  
Daniel F. Spulber

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### APPENDIX A

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Ph.D. Advisor: Dale Mortensen (Nobel Memorial Prize in Economic Sciences, 2010)

M.A., Economics, Northwestern University, 1976

B.A., Economics, University of Michigan, 1974

#### CURRENT PROFESSIONAL APPOINTMENTS

Elinor Hobbs Distinguished Professor of International Business, Kellogg School of Management, September, 2000 to present.

Professor, Strategy Department, Kellogg School of Management, Northwestern University, June 1, 1990 to present.

Professor of Law, Courtesy, Northwestern University Pritzker School of Law, October 2000 to present.

Professor of Managerial Economics and Decision Sciences, Kellogg School of Management, Northwestern University, Courtesy, June 1, 1993 to present.

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### **PREVIOUS PROFESSIONAL APPOINTMENTS**

Research Director of the Searle Center on Law, Regulation, and Economic Growth, and Northwestern University Center on Law, Business, and Economics at the Pritzker School of Law, September, 2010 to June, 2020.

Research Director: Program on Innovation, Entrepreneurship, and Economic Growth, Searle Center on Law, Regulation, and Economic Growth, Northwestern University Pritzker School of Law, Fall, 2007 to Fall, 2010.

Founding Director of International Business & Markets Program and Research Center, Kellogg School of Management, Northwestern University, July 2001 to July 2006.

Chair in Energy Resource Management, Kellogg School of Management, Northwestern University, June 1, 1990 to September, 2000.

Visiting Professor of Economics, California Institute of Technology, September, 1989 to December, 1989.

Professor of Economics and Law, University of Southern California Law School, September, 1988 to May, 1990.

Professor of Economics, University of Southern California, September, 1988 to May, 1990.

Visiting Associate Professor of Economics, California Institute of Technology, January, 1988 to June, 1988.

Associate Professor of Economics, with tenure, University of Southern California, September, 1984 to August, 1988.

Research Associate, Institute for Marine and Coastal Studies, University of Southern California, July, 1982 to June, 1984.

Assistant Professor of Economics, University of Southern California, July, 1982 to August, 1984.

Assistant Professor of Economics, Brown University, September, 1978 to June, 1982.

### **AFFILIATIONS AND MEMBERSHIPS**

Member, American Economic Association

Member, The Royal Economic Society

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Member, INFORMS, The Institute for Operations Research and the Management Sciences

Member, Expert Network, Vega Economics, <https://vegaeconomics.com/>

### EXPERT EXPERIENCE

Spulber has provided expert testimony in oral and written form in matters concerning Antitrust, Intellectual Property (IP), Platforms and Two-sided Markets, Telecommunications, Cable and Satellite Television, Postal Services, Natural Gas, and Network Industries.

Spulber's research has been cited by the Supreme Court of the United States.<sup>1</sup> Spulber's research also has been cited by the Federal Communications Commission.<sup>2</sup>

He has provided expert testimony before the Federal Trade Commission (FTC), the Federal Communications Commission (FCC), the Federal Energy Regulatory Commission (FERC), the International Trade Commission (ITC), the Postal Rate Commission, and state regulatory agencies including the Illinois Commerce Commission (ICC), the California Public Utilities Commission (CPUC), the Indiana Utility Regulatory Commission, the Washington Utilities and Transportation Commission, and the Wisconsin Public Service Commission.

Spulber has testified or prepared written testimony before the Superior Court for the State of California for the County of Los Angeles, the U.S. District Court for the Western District of Texas, and the U.S. District Court for the District of Columbia.

### WEB PAGES

Daniel F. Spulber, SSRN AUTHOR PAGE, OVER 15,000 downloads, Accessed May 16, 2021, [https://papers.ssrn.com/sol3/cf\\_dev/AbsByAuth.cfm?per\\_id=31293](https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=31293)

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<sup>1</sup> See 535 U. S. 467 (2002), p. 499, p. 514, p. 534, p. 549, p. 551; 525 U. S. 366 (1999), pp. 426-7.

<sup>2</sup> See for example TARIFF INVESTIGATION ORDER AND FURTHER NOTICE OF PROPOSED RULEMAKING, In the Matter of Business Data Services in an Internet Protocol Environment Investigation of Certain Price Cap Local Exchange Carrier Business Data Services Tariff Pricing Plans Special Access for Price Cap Local Exchange Carriers AT&T Corporation Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services, WC Docket No. 16-143, WC Docket No. 15-247, WC Docket No. 05-25 RM-10593, Comment Date: June 28, 2016 Reply Comment Date: July 26, 2016 Adopted: April 28, 2016 Released: May 2, 2016.

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Daniel F. Spulber, IDEAS, Ranked 123<sup>rd</sup> among economists by number of journal pages weighted by number of authors, as of April, 2021, Accessed May 16, 2021, <https://ideas.repec.org/top/top.person.anbpages.html>.

Daniel F. Spulber, IDEAS, May 16, 2021, Abstract views (working papers 12,552, journal articles 26,527), File downloads (working papers 2,752, articles 6,343) <https://logec.repec.org/RAS/psp13.htm>

Daniel F. Spulber, Kellogg School of Management, FACULTY WEBPAGE:

[http://www.kellogg.northwestern.edu/Faculty/Directory/Spulber\\_Daniel.aspx](http://www.kellogg.northwestern.edu/Faculty/Directory/Spulber_Daniel.aspx)

Daniel F. Spulber, Northwestern Pritzker School of Law webpage:

<https://www.law.northwestern.edu/faculty/profiles/DanielSpulber/>

Daniel F. Spulber, AMAZON AUTHOR PAGE: [https://www.amazon.com/Daniel-F.-Spulber/e/B001ITX7JI/ref=ntt\\_dp\\_epwbk\\_0](https://www.amazon.com/Daniel-F.-Spulber/e/B001ITX7JI/ref=ntt_dp_epwbk_0)

Daniel F. Spulber, PUBLONS profile, <https://publons.com/researcher/2872084/daniel-f-spulber/>

Daniel F. Spulber, Editor, Journal of Economics & Management Strategy (JEMS), <http://editjems.org/>

Journal of Economics & Management Strategy (JEMS) is ranked at 90<sup>th</sup> out of 2,610 journals by IDEAS. Accessed May 16, 2021, <https://ideas.repec.org/top/top.journals.simple.html>.

Journal of Economics & Management Strategy (JEMS) at Wiley Online Library: <https://onlinelibrary.wiley.com/journal/15309134>

JEMS on Twitter: [@jemsjournal](https://twitter.com/jemsjournal)

JEMS Facebook: <https://www.facebook.com/jemsjournal>

TECHNOLOGY – ACADEMICS – POLICY (TAP): <https://www.techpolicy.com/Academics/Dan-Spulber.aspx>

Daniel F. Spulber, <https://www.concurrences.com/en/auteur/daniel-f-spulber>

## COURSES

Sidney J. Levy Teaching Award for excellence in teaching, 1995-1996 academic year.



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### **Current teaching:**

International Business Strategy STRT 460 (MBA)

Technology and Innovation, MECS 549-1 (PhD)

Research in Economics, MECS 560-3 (PhD)

### **Other management courses taught:**

Strategy and Organization 460 (MBA)

Public Policy and Management Strategy (MBA and Executive Management Program)

### **Economics courses taught:**

Microeconomic Theory (Undergraduate and PhD);

Law and Economics (Undergraduate and PhD);

Industrial Organization (Undergraduate and PhD);

Regulation (PhD);

Energy and Resource Economics (Undergraduate and PhD);

Environmental Economics (Undergraduate)

### **Law courses taught:**

Regulated Industries

## **JOURNAL EDITING**

Founding Editor, Journal of Economics & Management Strategy, Wiley-Blackwell Publishers, 1991 to present.

Editor, Special issue, Innovation Economics and Technology Standards, Journal of Competition Law and Economics, 2013, 9 (4), Oxford University Press,  
<https://academic.oup.com/jcle/issue/9/4>.

Member, International Advisory Board, Decision, Indian Institute of Management, Springer, 2014 to present.

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Member, Advisory Board, Peking University Law Journal, 2012 to present, Taylor & Francis, <https://www.tandfonline.com/action/journalInformation?show=editorialBoard&journalCode=rplj20>

Editorial board, Journal of Strategic Management Education, Senate Hall Academic Publishing, 2004 to present, <http://www.senatehall.com/strategic-management>

Coeditor, Papers and Proceedings of the American Economic Association, American Economic Review, May 1980.

### WORKING PAPERS

Spulber, Daniel F., Combining Standard Essential Patents: Bargaining in the Market for Technology (January 15, 2021). Revised. Available at SSRN: <https://ssrn.com/abstract=3338997> or <http://dx.doi.org/10.2139/ssrn.3338997>.

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### PUBLICATIONS

#### BOOKS

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Chinese edition, 2012, Truth & Wisdom Press, Shanghai.

Daniel F. Spulber, Networks in Telecommunications: Economics and Law, with Christopher S. Yoo, 2009, Cambridge: Cambridge University Press, ISBN-13: 9780521673860 (paperback), ISBN-13: 9780521857109 (hardback).

Daniel F. Spulber, Economics and Management of Competitive Strategy, 2009, Singapore: World Scientific Publishing Company, ISBN 978-981-283-846-9, ISBN 978-981-3224-77-3 (paperback). <https://doi.org/10.1142/7171> |

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Daniel F. Spulber, Management Strategy, 2004, New York: McGraw Hill, pp. 431 + xv, ISBN 0072873485.

Daniel F. Spulber, Famous Fables of Economics: Myths of Market Failures, edited, 2002, Malden, MA: Basil Blackwell, pp. 312 +viii., ISBN 0-631-22674-5 (hardback) and ISBN 0-631-22675-3 (paperback).

Chinese edition, 2017, Guangxi Normal University Press Group Co.

Chinese edition (simplified characters) 2004, Century Publishing Group of Shanghai.

Daniel F. Spulber, Market Microstructure: Intermediaries and the Theory of the Firm, 1999, New York: Cambridge University Press, xxx + 368p., ISBN 0-521-65025-9 (hardback) and 0-521-65978-7 (paperback).

Chinese edition, 2003.

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Chinese edition, 2004.

Daniel F. Spulber, Deregulatory Takings and the Regulatory Contract: The Competitive Transformation of Network Industries in the United States, 1997, with J. Gregory Sidak, Cambridge University Press, xi + 631p., ISBN 0-521-591597 (hardback and paperback).

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Nominated for the 2021 Antitrust Writing Awards by Concurrences and George Washington University for the best Academic article category in the subcategory Intellectual Property

R. Andrew Butters and Daniel F. Spulber, The Extent of the Market and Integration through Factor Markets: Evidence from Wholesale Electricity, 2020, Economic Inquiry, Vol. 58, No. 3, July, pp. 1076–1108, <https://doi.org/10.1111/ecin.12879>.

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Alexei Alexandrov and Daniel F. Spulber, Sufficient Decisions in Multi-Sided and Multi-Product Markets, 2017, Journal of Industrial Economics, 65:4, December, pp. 739–766, doi: 10.1111/joie.12159, <http://rdcu.be/Cm6l>.

Joaquin Poblete and Daniel F. Spulber, Managing Innovation: Optimal Incentive Contracts for Delegated R&D with Double Moral Hazard, 2017, European Economic Review, 95, June, pp. 38-61, <http://www.sciencedirect.com/science/article/pii/S001429211730051X>

Daniel F. Spulber, Complementary Monopolies and Bargaining, 2017, Journal of Law & Economics, 60 (1), February, pp. 29-74. <https://doi.org/10.1086/692586>.

Nominated for 2018 Best Academic Article, Economics, Antitrust Writing Awards, Concurrences, <http://awards.concurrences.com/>

Daniel F. Spulber, Antitrust Policy toward Standards, 2016, Antitrust Chronicle, Competition Policy International, September, 1, 3, pp. 37-40, <https://www.competitionpolicyinternational.com/antitrust-policy-toward-technology-standards/>.

Daniel F. Spulber, Patent Licensing and Bargaining with Innovative Complements and Substitutes, 2016, Research in Economics, 70, 4, pp. 693-713, <http://dx.doi.org/10.1016/j.rie.2016.08.004>.

Nominated for 2017 Antitrust Writing Awards, Academic Articles, Intellectual Property, Concurrences Review.

Daniel F. Spulber, Public Prizes versus Market Prices: Should Contests Replace Patents?, 2015, Journal of the Patent and Trademark Office Society, 97, 4, December, pp. 690-735.

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Daniel F. Spulber, How Patents Provide the Foundation of the Market for Inventions, 2015, Journal of Competition Law and Economics, June, 11, 2, pp. 271-316, doi:10.1093/joclec/nhv006, (lead article).

Nominated for 2016 Antitrust Writing Awards, Academic Articles, Intellectual Property, Concurrences Review.

Daniel F. Spulber and Christopher Yoo, Antitrust, the Internet, and the Economics of Networks, 2014, Chapter 17 in Roger Blair and Daniel D. Sokol, eds., Oxford Handbook of International Antitrust Economics, Volume 1, Oxford: Oxford University Press, pp. 380-403.

Daniel F. Spulber, How Do Competitive Pressures Affect Incentives to Innovate when there is a Market for Inventions?, 2013, Journal of Political Economy, 121, 6, December, pp. 1007-1054 (lead article).

Daniel F. Spulber, Innovation Economics: Technology Standards, Competitive Conduct and Economic Performance, 2013, Journal of Competition Law and Economics, 9 (4), pp. 777-825, doi:10.1093/joclec/nht041.

Daniel F. Spulber, On Turning Twenty: The Journal of Economics & Management Strategy Comes of Age, 2013, in Michael Szenberg and Lall Ramrattan, eds., Secrets of Economic Editors: Experience of Journal Editors, Cambridge, MA: MIT Press, Chapter 8, pp. 135-148.

Andrei Hagiu and Daniel F. Spulber, First-Party Content and Coordination in Two-Sided Markets, 2013, Management Science, Volume 59 (4), April, pp. 933-949, advance access 2012, doi:10.1287/mnsc.1120.1577.

Daniel F. Spulber, Competing Inventors and the Incentive to Invent, 2013, Industrial and Corporate Change, Volume 22 (1), February, pp. 33-72, doi: 10.1093/icc/dts013.

Daniel F. Spulber, Tacit Knowledge with Innovative Entrepreneurship, 2012, International Journal of Industrial Organization, Volume 30, Issue 6, November, pp. 641-653, doi:10.1016/j.ijindorg.2012.07.004.

Joaquin Poblete and Daniel F. Spulber, The Form of Incentive Contracts: Agency with Moral Hazard, Risk Neutrality, and Limited Liability, 2012, Rand Journal of Economics, Volume 43, No. 2, Summer, pp. 215–234 (lead article), doi: 10.1111/j.1756-2171.2012.00163.x.

Richard Epstein, F. Scott Kieff and Daniel F. Spulber, The FTC, IP, and SSOs: Government Hold-Up Replacing Private Coordination, with 2012, Journal of Competition Law and Economics, March, Volume 8, Issue 1, pp. 1-46. doi: 10.1093/joclec/nhs002.

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Daniel F. Spulber, Intellectual Property and the Theory of the Firm, 2011, Chapter 1 in F. Scott Kieff and Troy Paredes, eds., Perspectives on Commercializing Innovation, Cambridge: Cambridge University Press, pp. 9-46.

Alexei Alexandrov, George Deltas, and Daniel F. Spulber, Competition and Antitrust in Two-Sided Markets, 2011, Journal of Competition Law and Economics, December, Volume 7, Issue 4, pp. 775-812, doi:10.1093/joclec/nhr012.

Daniel F. Spulber, Should Business Method Inventions be Patentable?, 2011, Journal of Legal Analysis, volume 3, number 1, Spring, pp. 265-340.

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Daniel F. Spulber, The Map of Commerce: Internet Search, Competition, and the Circular Flow of Information, Journal of Competition Law and Economics, Volume 5, Issue 4, December, 2009, pp. 633-682, doi: 10.1093/joclec/nhp011, Advance Access published on August 24, 2009.

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Daniel F. Spulber, Unlocking Technology: Antitrust and Innovation, Journal of Competition Law and Economics, Volume 4, Number 4, December, 2008, pp. 915-966, doi:10.1093/joclec/nhn016

Selected as number 4 among the 12 Best Papers on Antitrust & the Digital Economy, The Technology Liberation Front blog, Adam Thierer, September 6, 2012, <http://techliberation.com/>

Reprinted in Geoffrey A. Manne and Joshua D. Wright, eds., Competition Policy and Patent Law under Uncertainty: Regulating Innovation, Cambridge: Cambridge University Press, 2011, pp. 120-165.

Daniel F. Spulber, Consumer Coordination in the Small and in the Large: Implications for Antitrust in Markets with Network Effects, Journal of Competition Law and Economics, 4, June, 2008, pp. 207-262, doi: 10.1093/joclec/nhm031.

Daniel F. Spulber and Christopher S. Yoo, Mandating Access to Telecom and the Internet: The Hidden Side of *Trinko*, Columbia Law Review, 107, December, No. 8, 2007, pp. 1822-1907.

Daniel F. Spulber, Firms and Networks in Two-Sided Markets, in Terry Hendershott ed., Handbook of Economics and Information Systems, 1, Amsterdam: Elsevier, 2006, pp. 137-200.

Alberto Salvo and Daniel F. Spulber, CEMEX: International Market Maker in Cement, Journal of Strategic Management Education, 2006, 3, pp. 1-24.

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Ramon Casadesus-Masanell and Daniel F. Spulber, Trust and Incentives in Agency, University of Southern California Interdisciplinary Law Journal, 15, Fall, 2005, pp. 45-104.

Daniel F. Spulber, Lenovo: The Leading Chinese Computer Company Enters Global Competition, Journal of Strategic Management Education, v. 2, Number 1, 2005, pp. 55-81.

Daniel F. Spulber and Christopher S. Yoo, On the Regulation of Networks as Complex Systems: A Graph Theory Approach, Northwestern University Law Review, 2005, 99, Fall, pp. 1687-1722.

Daniel F. Spulber, Management Strategy: Five Steps to Successful Strategic Analysis, in Peter Navarro, ed., What the Best MBAs Know: How to Apply the Greatest Ideas Taught in the Best Business Schools, New York: McGraw Hill, 2005, pp. 19-56.

Daniel F. Spulber, Entry Barriers and Entry Strategies, Journal of Strategic Management Education, 1, 2003, March, pp. 55-80.

Reprinted in Andrew E. Burke, Modern Perspectives on Entrepreneurship, 2006, Dublin: Senate Hall Academic Publishing, pp. 69-90.

Daniel F. Spulber and Christopher S. Yoo, Access to Networks: Economic and Constitutional Connections, Cornell Law Review, 2003, 88, pp. 885-1024.

Daniel F. Spulber, The Intermediation Theory of the Firm: Integrating Economic and Management Approaches to Strategy, Managerial and Decision Economics, 24, 2003, pp. 253-266.

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Ramon Casadesus-Masanell and Daniel F. Spulber, The Fable of Fisher Body, Journal of Law and Economics, 43, April, 2000, pp. 67-104.

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Daniel F. Spulber, First Annual Conference on The Economics and Law of Internet Search, 2010, <http://www.law.northwestern.edu/searlecenter/conference/internet/index.html>

Daniel F. Spulber, Second Annual Conference on The Economics and Law of the Entrepreneur, Searle Center on Law, Regulation and Economic Growth, June, 2009,  
<http://www.law.northwestern.edu/searlecenter/conference/entrepreneur/index.html>

Daniel F. Spulber, Book Preview Roundtable, Daniel F. Spulber and Christopher Yoo, Networks in Telecommunications, 2008,  
[http://www.law.northwestern.edu/academics/searle/conference/roundtable/Networks\\_agenda.pdf](http://www.law.northwestern.edu/academics/searle/conference/roundtable/Networks_agenda.pdf)

Daniel F. Spulber, First Annual Conference on The Economics and Law of the Entrepreneur, Searle Center on Law, Regulation and Economic Growth, June, 2008,  
<http://www.law.northwestern.edu/searlecenter/conference/entrepreneur/index.html>

Daniel F. Spulber, Book Preview Roundtable, Daniel F. Spulber's The Theory of the Firm, Searle Center on Law, Regulation and Economic Growth, 2008,  
[http://www.law.northwestern.edu/academics/searle/conference/roundtable/theory\\_agenda.pdf](http://www.law.northwestern.edu/academics/searle/conference/roundtable/theory_agenda.pdf)

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### OUTSIDE ACTIVITIES

Daniel F. Spulber, Member of the Jury, 2021 Antitrust Writing Award, Concurrences.

Daniel F. Spulber, 2017, Reviewer for 2018 Kauffman Dissertation Fellows, Ewing Marion Kauffman Foundation.

Daniel F. Spulber, Interview for the Global Antitrust Economics Conference, interviewed by Managing Principal Jeffrey Cohen (Analysis Group).<https://www.eventbrite.com/e/interview-with-daniel-spulber-the-global-antitrust-economics-conference-tickets-26910829014>, Concurrences + Searle Center on Law, Regulation, and Economic Growth at Northwestern Pritzker School of Law, Friday, October 7, 2016, Chicago, IL.

### SELECTED PRESENTATIONS

#### 2021

Speaker, Book Roundtable, The Case for Patents, by Daniel F. Spulber, Technology, Innovation, and Intellectual Property Program, Classical Liberal Institute, New York University, May 11, 2021.

Speaker, Seminar, Antitrust and Innovation Competition, United States Patent and Trademark Office (USPTO), Washington, D.C., April 1, 2021.

Speaker, The Case for Patents, Annual conference on Intellectual Property Rights, Intellectual Property 2021: New Risks, New Challenges & Emerging Solutions, April 26-28 2021, World IP Forum, <https://www.worldipforum.com/wipf-speakers.php?login=success>.

Speaker, The Case for Patents, Podcast, Mercatus Institute, George Mason University, Washington, D.C., 2021, <https://www.mercatus.org/>.

Speaker, Seminar, “The Case for Patents,” Lazarides Institute, Wilfred Laurier University, Waterloo, Canada, Thursday, March 25, 2021.

Speaker, Panel, Digital Platforms: Innovation, Antitrust, Privacy & the Internet of Things, Center for intellectual Property, Information, and Privacy Law, John Marshall Law School, University of Illinois, Chicago. March 12, 2021.

Speaker, LeadershIP Roundtable, IP, Antitrust and Standards: Have We Reached Global Convergence?, February 2, 2021.

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Book Roundtable, Innovators, Firms, and Markets: The Organizational Logic of Intellectual Property by Jonathan M. Barnett, Technology, Innovation, and Intellectual Property Program, Classical Liberal Institute, New York University, January 14, 2021.

### 2020

Speaker, Panel, FRAND and the Automotive Value Chain, SEP2020 Conference, IPWatchdog, November 17, 2020.

Speaker, Panel, AI and IP, Conference, Joint program with the Giles S. Rich Inn, Pauline Newman IP American Inn of Court, October 20, 2020.

Speaker, Panel, The Antitrust IP Interface: How Antitrust Affects IP Implementation, online broadcast at World Intellectual Property Review/ Life Sciences Intellectual Property Review, Newton Media Ltd, Kingfisher House, 21-23 Elmfield Road, Bromley BR1 1LT United Kingdom, October 22, 2020, <https://www.lspnconnect.com/>

Speaker, Panel, Using Data to Inform Policy: Empirical Evidence on SEPs, SSOs and FRAND Royalties, 5G at the Nexus of IP, Antitrust, and Technology Leadership, Eighth Annual Fall Conference hosted by the Center for the Protection of Intellectual Property (CPIP) at Antonin Scalia Law School, George Mason University, Arlington, Virginia. Wednesday, October 7 and Thursday, October 8, 2020.

Speaker, Making IP Markets, IP Licensing Roundtable, Center for the Protection of Intellectual Property (CPIP) at Antonin Scalia Law School, George Mason University, Thursday, September 17<sup>th</sup>, 2020.

Coauthor speaker, Paper Session, TIM Conversations - Technology Acquisitions, Firm Matching in the Market for Technology: Harnessing Creative Destruction, with Pere Arque-Castells, University of Groningen, Academy of Management, Vancouver, BC, Canada, August 10, August 7-11, 2020.

Speaker, Panel on Antitrust Issues, Digital Platforms: Innovation, Antitrust, and Privacy, Center for intellectual Property, Information, and Privacy Law, John Marshall Law School, University of Illinois, Chicago, IL, March 13, 2020.

Speaker, Antitrust Policy toward Patent Licensing: Why Negotiation Matters, Sponsored by the National Science Foundation (NSF), 2020 Future of IP Conference, Orlando Florida, February 28, 2020.

### 2019



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Speaker, Licensing Standard Essential Patents: What is Fair, Reasonable, and Non-Discriminatory?, Bayard Wickliffe Heath Memorial Lecture, University of Florida Law School, March 20, 2019.

Speaker, Panel on Economics of Intellectual Property, USPTO Conference on Artificial Intelligence: Intellectual Property Policy Considerations, January 31, 2019, USPTO, Alexandria, VA.

### 2018

Speaker, Panel, Session on Competition and Performance: The Role of Technology and Innovation Strategies, Academy of Management, Chicago, IL, August 13, 2018.

Speaker, Panel, Session on Organization Design and Industry Dynamics, Ecosystem Design and Industry Dynamics, Annual Organization Design Conference Chicago, IL, August 12, 2018.

Speaker, Panel, ABA Antitrust Section - IP Committee: Teleconference on Essential Patents and the Agencies – Incentives to Standardize, March 6, 2018.

### 2017

Coauthor presentations of Pere Arqué-Castells and Spulber, Daniel F., The Market for Technology: Harnessing Creative Destruction: Fifth Annual Research Roundtable on Patents and Technology Standards, May 4-5, 2017, Chicago; 7th ZEW/MaCCI Conference on the Economics of Innovation and Patenting, May 9, 2017, Mannheim, Germany; European Policy for Intellectual Property (EPIP) 2017 Conference, September 4-7 2017, Bordeaux, France; Barcelona GSE workshop on the Economics of Science and Innovation, June 15-16, 2017, Barcelona, Spain; 2017 Intellectual Property Statistics for Decision Makers (IPSDM) conference, November 14-15 in Mexico City; Workshop on challenges of innovation policy, November 24, 2017, Reus, Spain.

Speaker, The Internet of Things: Economic Effects and Public Policy Implications, Cyber-physical Technologies to Enable the Internet of Things, Office of Research Development LINC Series: Launching INterdisciplinary Connections, February 15th, 2017, Cook Hall room 2058, Evanston Campus, Northwestern University.

### 2016

Speaker, Economics of Fostering Innovation and Open Standards in Payment Markets, Federal Reserve Bank of Chicago (FRBC), Chicago Payment Symposium, Chicago, IL, October 12-13, 2016.

Speaker, Panel on “Innovation Economics and New Business Models: Which Consequences for Antitrust Policy?” Global Antitrust Conference, Concurrences Review, Chicago, IL, October 7, 2016.

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*Remand Written Rebuttal Testimony of Daniel F. Spulber, Ph.D.*  
*Dkt No. 16-CRB-0003-PR (2018-2022) (Remand)*

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Speaker, Panel on Patent Holdup, Royalty Stacking, and Standards: Theory and Evidence, Conference on Patent Holdup Theory Implications for The Courts, Government, and the Legislature, Stanford University's Hoover Working Group on Intellectual Property, Innovation, and Prosperity (Hoover IP2), Washington, D. C., October 4, 2016.

Speaker, Standard Setting Organizations and Standard Essential Patents: Voting Power versus Market Power, Ninth Annual Searle Center Conference on Antitrust Economics and Competition Policy, September 16-17, 2016, Northwestern Pritzker School of Law.

Speaker, Session on Consequences of the IoT: Economic Implications, General Accountability Office (GAO) Meeting of Experts on Internet of Things, National Academies of Sciences, Engineering, and Medicine, Washington, D. C., May 24-25, 2016.

Keynote speaker, “What Can We Learn From Technology Standards?,” Fourth Annual Research Roundtable on Patents and Technology Standards, Searle Center on Law, Regulation and Economic Growth, Northwestern University, May 5-6, 2016.

Seminar speaker, “Standard Setting Organizations and Standard Essential Patents: Voting Power versus Market Power,” Managerial Economics and Decision Sciences (MEDS), Kellogg School of Management Northwestern University, April 1, 2016.

Seminar speaker, “Standard Setting Organizations and Standard Essential Patents: Voting Power versus Market Power,” Technology & Operations Management, Harvard Business School, March 28, 2016.

### SELECTED ENGAGEMENTS

Daniel F. Spulber, 2019, Expert analysis and consulting, Research project on licensing Standard Essential Patents (SEPs), Nokia Technologies.

Daniel F. Spulber, 2018, Expert analysis and consulting, Research project, Nokia Technologies.

Daniel F. Spulber, 2017, Expert Witness, Economic Analysis for Rovi Corporation (TiVo Corporation), In the Matter of Certain Digital Video Receivers and Hardware and Software Components Thereof, Statement before the United States International Trade Commission, Washington, D.C., Oral Deposition.

Daniel F. Spulber, 2017, Expert analysis for Congressional Requestors, GAO-17-75, Technology Assessment, Internet of Things: Status and Implications of an Increasingly Connected World, United States Government Accountability Office, Washington, D.C.. Oral presentation.

Daniel F. Spulber, 2017, Expert analysis and consulting, Research project, Nokia Technologies.

Daniel F. Spulber, 2016, Expert Witness. Economic Analysis for Razor, In the Matter of Certain Motorized Self-balancing Vehicles, Investigation no. 337-ta-1000, Complaint under section 337

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*Dkt No. 16-CRB-0003-PR (2018-2022) (Remand)*

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of the tariff act of 1930, as amended, Expert analysis of Alibaba.com. Before the United States International Trade Commission, Washington, D.C., December.

Daniel F. Spulber, 2014, Brief of Amicus Curiae, The Intellectual Property High Court of Japan, Apple v. Samsung, March.

Daniel F. Spulber, 2014, Brief of Amici Curiae Trading Technologies International, Inc., Cantor Fitzgerald, L.P., Cummins Inc., Scientific Games Corporation, Align Technology, Inc., et al., in Support of Petitioner, Alice Corporation Pty. Ltd., Petitioner, v. CLS Bank International and CLS Services Ltd., Respondents, Supreme Court of the United States, January.

Daniel F. Spulber with J. Gregory Sidak, 2013, Declaration on Behalf of América Móvil, S.A.B. de C.V. before the Comisión Federal de Telecomunicaciones, Mexico, January.

Daniel F. Spulber, 2012, Served as Expert Witness, Economic Analysis for ChriMar Systems, Inc., In the matter of Certain Communication Equipment, Components Thereof, and Products Containing the Same, Including Power Over Ethernet Telephones, Switches, Wireless Access Points, Routers and Other Devices Used in LANS, and Cameras, before the United States International Trade Commission, Washington, D.C.. Oral Deposition.

Daniel F. Spulber, with Richard A. Epstein and F. Scott Kieff, 2011, Prepared report titled “The FTC’s Proposal for Regulating IP through SSOs Would Replace Private Coordination with Government Hold-Up,” August 5, White paper submitted at the Request of Qualcomm for the Federal Trade Commission’s (FTC) Patent Standards Workshop, Washington, D.C.

Declaration of Economists and Antitrust Scholars on Behalf of Radiomóvil Dipsa S.A. de C.V. (Telcel), Reconsideration Recourse, RA-007-2011, Case File No. DE-37-2006, Comisión Federal de Competencia (United Mexican States) (Oct. 14, 2011), co-authored with Robert H. Bork, Michael J. Boskin, Kenneth G. Elzinga, Paul W. MacAvoy, George L. Priest, Pablo T. Spiller, Daniel F. Spulber, and David J. Teece.

Daniel F. Spulber, 2010, Amicus Brief of Distinguished Economists on Rehearing *en banc* in Support of the Appellee TiVo Inc, in favor of Affirmance, TiVo v. EchoStar, Court of Appeals for the Federal Circuit.

Daniel F. Spulber, 2009, Prepared Economic Expert report on Securities and Exchange Commission policies toward High Frequency/Flash Trading.

Daniel F. Spulber, 2009, Prepared Economic Expert report on behalf of three independently-licensed television channels that are telecast on the two subscriber platforms in Israel: Channel 9 Israel Plus; Channel 24, the Israeli Music Channel; and Channel 21, the Shopping Channel, Statement before the Israeli Ministry of Communication.

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Supreme Court of the United States, 2007, No. 07-512 (filed Nov. 16, 2007) Brief of Amici Curiae Professors and Scholars in Law and Economics in Support of the Petitioners, Pacific Bell Telephone Co. v. linkLine Communications, Inc., (brief on behalf of William J. Baumol, Robert H. Bork, Robert W. Crandall, George Daly, Harold Demsetz, Jeffrey A. Eisenach, Kenneth G. Elzinga, Gerald Faulhaber, Franklin M. Fisher, Charles J. Goetz, Robert Hahn, Jerry A. Hausman, Thomas M. Jorde, Robert E. Litan, Paul W. MacAvoy, J. Gregory Sidak, Pablo T. Spiller, and Daniel F. Spulber), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1030990](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1030990).

Daniel F. Spulber, 2001, Prepared expert testimony on pole attachments for Georgia Power Company in Teleport Communications Atlanta, Inc. v. Georgia Power Company, PA No. 00-006 before the Federal Communications Commission, February.

Daniel F. Spulber, 1998, Prepared expert testimony on behalf of GTE in Joint Application of AT&T Corp. and Tele-Communications, Inc. for Transfer of Control to AT&T of Licences and Authorizations Held by TCI and its Affiliates or Subsidiaries, Federal Communications Commission, CS Docket No. 98-178.

Daniel F. Spulber, 1998, Prepared expert report on Contribution of Windows Complements Providers in the Silicon Valley, Microsoft, September.

Daniel F. Spulber, 1997, Provided economic consulting to Enova Corporation (San Diego Gas and electric and Enova energy) and Pacific Enterprises (Southern California Gas) regarding their merger to form Sempra Energy.

Daniel F. Spulber, 1997, Expert report on securitization of stranded costs, Detroit Edison, November.

Daniel F. Spulber, 1997, Prepared expert testimony before the Surface Transportation Board, for Union Pacific Railroad Company and Southern Pacific Transportation Company in the matter of the Application of the National Railroad Passenger Corporation under 49 U.S.C. 24308a-Union Pacific and Southern Pacific Transportation Company, November 10.

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Daniel F. Spulber, 1997, Prepared extensive local exchange competition study regarding the Telecommunications Act checklist and prepared written testimony for Pacific Bell, before the Federal Communications Commission in the Matter of Applications for Authority Under Section 271 of the Communications Act to Provide In-Region InterLATA Service in the State of California, March.

Daniel F. Spulber, 1997, with Michael Doane, Prepared study “Renegotiating the Regulatory Contract: Opportunism, Municipalization, and Bypass in the U.S. Electric Power Industry,” for the Edison Electric Institute, February.

Daniel F. Spulber, 1997, Expert testimony for GTE Arbitration of interconnection agreements pursuant to the Telecommunications Act of 1996, before the Illinois Commerce Commission, the Indiana Utility Regulatory Commission, the Washington Utilities and Transportation Commission, and the Wisconsin Public Service Commission. Written statement presented in 28 states.

Daniel F. Spulber, 1997, GTE Arbitration of interconnection agreements, Illinois Commerce Commission, Oral testimony.

Daniel F. Spulber, 1997, GTE Arbitration of interconnection agreements, Indiana Utility Regulatory Commission, Oral testimony.

Daniel F. Spulber, 1997, GTE Arbitration of interconnection agreements, Washington Utilities and Transportation Commission, Oral testimony.

Daniel F. Spulber, 1997, GTE Arbitration of interconnection agreements, Wisconsin Public Service Commission, Oral testimony.

Daniel F. Spulber, with J. Gregory Sidak, 1997, Affidavit, appended to Comments of the United States Telephone Association in Usage of the Public Switched Network by Information Service and Internet Access Providers, Notice of Inquiry, Federal Communications Commission, CC Docket No. 96-263 (filed Mar. 24, 1997).

Daniel F. Spulber, with J. Gregory Sidak, Reply Affidavit of, appended to Reply Comments of the United States Telephone Association in Access Charge Reform; Price Cap Performance Review for Local Exchange Carriers; Transport Rate Structure and Pricing; Usage of the Public Switched Network by Information Service and Internet Access Providers, Notice of Proposed Rulemaking, Third Report and Order, and Notice of Inquiry, CC Docket Nos. 96-262, 94-1, 91-213, 96-263 (filed Feb. 14, 1997), Federal Communications Commission.

Daniel F. Spulber, with J. Gregory Sidak, Reply Affidavit, In the Matter of Access Charge Reform, CC Docket No. 96-262, Price Cap Performance Review, CC Docket No. 94-1 for Local Exchange Carriers, Transport Rate Structure, CC Docket No. 91-213 and Pricing, Usage of the

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Public Switched, CC Docket No. 96-263 Network by Information Service and Internet Access Providers, Federal Communications Commission,

Daniel F. Spulber, with J. Gregory Sidak, Reply Affidavit, appended to Comments of the United States Telephone Association in Access Charge Reform; Price Cap Performance Review for Local Exchange Carriers; Transport Rate Structure and Pricing; Usage of the Public Switched Network by Information Service and Internet Access Providers, Notice of Proposed Rulemaking, Third Report and Order, and Notice of Inquiry, Federal Communications Commission, CC Docket Nos. 96-262, 94-1, 91-213, 96-263 (filed Jan. 29, 1997).

Affidavit of Michael J. Doane, J. Gregory Sidak, and Daniel F. Spulber, “An Empirical Analysis of Pricing Under Sections 251 and 252 of the Telecommunications Act,” appended to Reply Comments of GTE Service Corporation in Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, Federal Communications Commission, CC Docket No. 96-98 (filed May 30, 1996).

Daniel F. Spulber, 1996, Testimony and accompanying statement on “Achieving Competition Fairly in California Telecommunications Markets,” Prepared for Pacific Bell, in the California Public Utilities Commission hearings on local exchange competition, January 1996. Oral testimony. October 9, 1995.

Daniel F. Spulber, 1996, Prepared Direct Testimony and Reply Testimony for Pacific Bell, “Pricing Resale Services and Unbundled Services in California Telecommunications,” in the Matter of Rulemaking on the Commission’s Own Motion to Govern Open Access to Bottleneck Services and Establish a Framework for Network Architecture Development of Dominant Carrier Networks, R. 93-04-003, and in the Matter of the Investigation on the Commission’s Own Motion into Open Access and Network Architecture Development of Dominant Carrier Networks, I. 93-04-002, before the Public Utilities Commission on the State of California, June 14.

Daniel F. Spulber, 1996, An Empirical Analysis of the Efficient Component-Pricing Rule and Sections 251 and 252 of the Telecommunications Act of 1996, appended to Comments of GTE Service Corporation in Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, Federal Communications Commission, CC Dkt. No. 96-98 (filed May 16, 1996), co-authored with Michael J. Doane.

Daniel F. Spulber, 1996, Affidavit for the United States Telephone Association, In the Matter of Implementation of the Non-Accounting Safeguards of Sections 271 and 272 of the Communications Act of 1934 as amended; (Docket No. 96-149) and Regulatory Treatment of LEC Provision of Interexchange Services Originating in the LEC’s Local Exchange Area, December, Federal Communications Commission.

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Daniel F. Spulber, 1995, Affidavit, for counsel for the Bell Operating Companies (BOCs), (Reply of Bellsouth Corporation, Nynex Corporation, and SBC Communications to initial comments on their motion to vacate the Modified Final Judgement consent decree), United States of America v. Western Electric Co., Inc. and American Telephone and Telegraph Company, Civil Action No. 82-0192, United States District Court for the District of Columbia, June.

Daniel F. Spulber, 1995, Report on proposals for Ramsey pricing by the United States Postal Service, prepared for United Parcel Service for submission to the Subcommittee on the Postal Service of the House committee on Government Reform and Oversight, June.

Daniel F. Spulber, 1994, Testimony with Pablo Spiller and George Schink, “Competition and Stranded Cost Recovery in the Electricity Sector,” part of Commonwealth Edison comments in Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, Federal Energy Regulatory Commission Docket No. RM94-7-000, December 9.

Daniel F. Spulber, 1994, Expert testimony and expert report prepared on behalf of the Advertising Mail Marketing Association, the Direct Marketing Association, and the Mail Order Association of America, before the United States Postal Rate Commission, in the Matter of Postal Rate and Fee Changes, August. Oral testimony.

Daniel F. Spulber, 1994, Expert report and deposition, Protectoseal, Oral deposition.

Daniel F. Spulber, 1994, Developed an auction bidding strategy for Ameritech in the Federal Communications narrowband PCS spectrum auctions.

Daniel F. Spulber, 1994, Developed an auction bidding strategy for Ameritech in the Federal Communications Commission broadband PCS spectrum auctions.

Daniel F. Spulber, 1993, Prepared direct testimony on behalf of Stingray Pipeline, Midcon Corp. regarding In the Matter of Stingray Pipeline Company, Docket No. RP91-212-000, before the Federal Energy Regulatory Commission, March.

Daniel F. Spulber, 1993, Prepared expert report on The Market for Electric Power in Niagara Mohawk Corporation’s Territory, for Niagara Mohawk Power Corp., July.

Daniel F. Spulber, 1993, Prepared expert report on regulatory pricing recommendations for Niagara Mohawk Power Corp..

Daniel F. Spulber, 1993, Prepared answering and rebuttal testimony on behalf of Texas Eastern Transmission Corp. before the Federal Energy Regulatory Commission, Great Lakes Gas Transmission Limited Partnership, Docket No. RP91-143-000, February 16, 1993 and April 29, 1993.

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Daniel F. Spulber, 1992, Keynote Speaker, En Banc Hearing on Natural Gas Procurement, State of California Public Utilities Commission, San Francisco, Ca, February. Oral testimony.

Daniel F. Spulber, 1991, Prepared direct testimony on behalf of Texas Eastern Transmission Corp. before the Federal Energy Regulatory Commission, Great Lakes Gas Transmission Limited Partnership, Docket No. RP91-143-000, pursuant to Commission Orders of May 31 and June 14, 1991, August 30.

Daniel F. Spulber, 1991, Report on Regulation of Health Care, California Association of Catholic Hospitals.

Daniel F. Spulber, 1991, Testimony on behalf of Pacific Refining Co. in the City of Long Beach v. Pacific Refining Co., Superior Court for the State of California for the County of Los Angeles, January. Oral testimony.

Daniel F. Spulber, 1989, Design of Interruptible Pricing Program, Niagara Mohawk Power Corp.

Daniel F. Spulber, 1988, Expert Report for Enron Corp., in JJCC Limited vs Transwestern Pipeline Corp., An Enron Corporation, U.S. District Court, Western District of Texas.

Daniel F. Spulber, Prepared testimony on behalf of Southern California Gas, Hearing on the Certification of Mojave and Kern River Natural Gas Pipelines.

Daniel F. Spulber, 1986, Prepared testimony on behalf of Santa Fe and Southern Pacific Railroads, supporting their merger proposal, Interstate Commerce Commission.

Daniel F. Spulber, 1985, Prepared testimony on Regulation-Induced Distortions in Natural Gas Markets and Take-or-Pay Contracts, for Oklahoma Natural Gas Pipeline, May.

Daniel F. Spulber, Prepared written testimony on behalf of Southern California Gas, Hearing on the sale of its headquarters building.



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#### Materials Relied Upon by Daniel G. Spulber

##### Academic Books, Journal Articles, and other Academic Literature

- Antoine Augustin Cournot, Researches Into the Mathematical Principles of the Theory of Wealth, Translated by Nathaniel T. Baker, 1838, 1897, New York: MacMillan
- J.M. Buchanan and Y.J. Yoon, Symmetric tragedies: Commons and anticommons, 2000, The Journal of Law and Economics, Vol. 43, No. 1
- Ehud Kalai, Nonsymmetric Nash solutions and replications of 2-person bargaining, 1977, International Journal of Game Theory, Vol. 6, No. 3
- F. Machlup, F. and M. Taber, Bilateral monopoly, successive monopoly, and vertical integration, 1960, Economica.
- Francesco Parisi and Ben DePoorter, The Market for Intellectual Property: The Case of Complementary Oligopoly in The Economics of Copyrights: Developments in Research and Analysis, 2003 (W. Gordon and R. Watt eds.)
- Edmund W. Kitch, Elementary and Persistent Errors in the Economic Analysis of Intellectual Property, 2000, Vanderbilt Law Review, Vol. 53
- John Nash, The Bargaining Problem, 1950, Econometrica, Vol. 18
- Abhinay Muthoo, Bargaining theory with applications, 1999, Cambridge University Press
- Pär Torstensson, An n-person Rubinstein bargaining game, 2009, International Game Theory Review, Vol. 11, No. 01
- Ariel Rubinstein, Perfect equilibrium in a bargaining model, 1982, Econometrica, Vol. 50

##### Restricted Documents

- Services' Joint Opening Brief
- Written Direct Remand Testimony of Michael L. Katz
- Written Direct Remand Testimony Leslie M. Marx
- Written Direct Remand Testimony Gregory K. Leonard

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*Remand Written Rebuttal Testimony of Daniel F. Spulber, Ph.D.*  
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- Written Rebuttal Testimony of Richard Watt
- AMZN\_Remand\_0000159: Agreement between Amazon and Warner
- AMZN\_Remand\_0000229: Amended & Restated Agreement between Amazon and Sony
- GOOG-PHONOIII-00005575: Sound Recording and Audiovisual Agreement between Google and Universal
- GOOG-PHONOIII-00005678: Sound Recording and Audiovisual Agreement between Google and Warner
- GOOG-PHONOIII-00005798: Sound Recording and Audiovisual Agreement between Google and Merlin
- GOOG-PHONOIII-00006117: Amendment to the Sound Recording and Audiovisual Agreement between Google and Universal
- PAN\_PRIII\_Remand\_00000237: Sound Recording Agreement between Pandora and Merlin
- PAN\_PRIII\_Remand\_00020252: Sound Recording Agreement between Pandora and Sony
- SPOTRMND0001225: Sound Recording Agreement between Spotify and Warner
- SPOTRMND0003036: Sound Recording Agreement between Spotify and Universal

### **Legal**

- *Determination of Royalty Rates and Terms for Making and Distributing Phonorecords (Phonorecords III)*, November 5, 2018 (Restricted) (“Final Determination”)
- *Determination of Royalty Rates and Terms for Ephemeral Recording and Webcasting Digital Performance of Sound Recordings (Web IV)*, 81 FR 26315 (May 2, 2016)
- *George Johnson et al. v. Copyright Royalty Board*, 969 F.3d 363 (D.C. Cir. 2020)
- 17 U.S.C. § 102(a)(7)

### **Industry Reports**

- RIAA, 2020 Year-End Music Industry Revenue Report, 2020, available at <https://www.riaa.com/reports/2020-year-end-music-industry-revenue-report/>

### **News and Journal Articles**

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- Brandt Ran, We Compared Popular Music Streaming Services — These Are the Three You Should Check Out, Rolling Stone, (March 12, 2021), available at <https://www.rollingstone.com/product-recommendations/electronics/best-music-streaming-services-compared-1011378/>

### **Financial**

- Nasdaq.com, “Spotify Technology S.A. Ordinary Shares,” Summary, available at <https://www.nasdaq.com/market-activity/stocks/spot> (CO Rem. Ex. V)

Before the  
COPYRIGHT ROYALTY BOARD  
LIBRARY OF CONGRESS  
Washington, D.C.

In the matter of

DETERMINATION OF RATES AND  
TERMS FOR MAKING AND  
DISTRIBUTING PHONORECORDS  
(Phonorecords IV)

Docket No. 21-CRB-0001-PR (2023-2027)

WRITTEN DIRECT TESTIMONY OF RICHARD WATT (PHD)

(On behalf of Copyright Owners)

OCTOBER 13, 2021

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## I. Scope of assignment and qualifications

- (1) At the request of the Copyright Owners in this proceeding, the National Music Publishers' Association and the Nashville Songwriters Association International, I was asked to evaluate, using economic theory and modelling, what would be appropriate mechanical royalty rates and terms to set in this proceeding for the years 2023-2027, and under the new statutory rate standard.
- (2) I am currently Professor of Economics in the Department of Economics and Finance at the University of Canterbury (New Zealand). I am also the General Secretary, and Past President, of the Society for Economic Research on Copyright Issues. I serve as the Managing Editor of the Review of Economic Research on Copyright Issues. I hold a Ph.D. in economic theory from the Autonomous University of Madrid (Spain).
- (3) I was qualified as an expert witness in the field of applied microeconomics and the economics of copyright in the Phonorecords III proceeding before the Board, where I submitted written and testimonial rebuttal evidence.
- (4) I have published numerous peer-reviewed articles, and I have been involved in economic research on issues around copyright licensing for over 20 years. A copy of my curriculum vitae is annexed at Appendix A. In forming my opinions, I have relied upon the materials annexed at Appendix B.

## II. Incorporation of prior analysis and testimony

- (5) Topics that I recently addressed in written testimony in the *Phonorecords III* remand proceeding are also relevant to the analysis concerning proper rates and terms in this proceeding, including topics on Nash bargaining, Shapley analysis and general economic theory in the context of the mechanical licensing market in the U.S. I believe this analysis may be useful to the Judges, and therefore attach my analysis from that proceeding as Appendix F, together with relevant exhibits, and incorporate that testimony into this report as well.

## III. Summary of opinions

- (6) An overview of some of my primary opinions is as follows:

- (i) This proceeding requires the tools of economic theory and modelling to accomplish reasonable rates. Benchmarking is valuable and informative, but also calls for economic modelling to apply appropriate adjustments. This is particularly true where there is economic distortion that may be baked into benchmarks. Such distortion could come from historical or current factors. In the current mechanical licensing market, both such distortions appear. Over a century of regulation at below-market rates can create a misleading picture of the mechanical market based on history, and the current streaming market is characterized by streaming services that have unprecedented asymmetries of information.
- (ii) Shapley analysis is well-suited to inform this rate proceeding under the new willing buyer/willing seller standard, both as to rate levels directly and as to benchmark adjustments. Shapley analysis captures the bargaining outcomes called for by the rate standard, while delivering an effectively competitive rate and a rate that reflects relative roles.
- (iii) There are a number of modelling choices that play into Shapley analysis, and the Judges should understand them and understand the effects of different choices. These choices include the players, the necessity of each player, the costs of each player and the revenues of the joint venture. With particular respect to necessity, I believe that the “must have” nature of record companies has not been modelled correctly to date. While there is a type of such necessity, it is more nuanced than a need for every existing record company to be available before surplus is generated. The need is for major record company catalogues *that other services have access to*. The loss of a catalogue by *all* services will reduce, but not prevent, revenues. Shapley analysis is ideal for this situation, as it requires each player to cooperate with all other players, removing abuse of market power by selective hold-out. This feature doubles to easily model the revenues generated by partial record company cohorts—joint ventures with less than all of the record companies, but where the same record company catalogues are available to all services. The result is a much



more sophisticated model of the market behaviour, and I show the results with and without this sophistication, to provide transparency about its effects.

- (iv) I model numerous different choices such as this, and also strive to explain the moving pieces and relative effects on the delivered results. In the end, the endeavour demonstrates that using *any* among the reasonable modelling choices leads to the conclusion that mechanical royalty rates should be significantly increased, and that the Copyright Owners' proposed rates are more than reasonable for the Services under the rate standard. This includes models that have the following numbers of players (with S as Services, L as record companies and P as music publishers): 3S-3L-3P; 4S-1L-1P; 1S-1L-1P; and 4S-4L-1P. I also show the results with assumptions that differ from the ones that I think are most appropriate, again to give the Judges more insight into how modelling choices affect the results.
- (v) Revenues that are generated by the joint venture but captured by a player outside of the shared revenue base ("displaced revenues") must be included in any analysis of surplus division in order to reflect an effectively competitive market. Displaced revenues that are not shared reflect information asymmetry among players and market failure.
- (vi) The rate standard calls for a rate that most willing buyers would agree to, which means willing buyers representing most of the market for buyers. Apple, Google and Amazon represent the majority of the market for buyers, and accounting in particular for their displaced revenues is thus called for under the rate standard. The size of the complementary product markets of the three technology firms that make up the majority of the streaming market are so large by comparison to the streaming market, that even tiny movements in those markets as a result of the music delivered by the joint venture deliver sharing rules that allocate more than 100% of streaming product revenues to copyright owners. Such sharing rules are effectively delivering the result as if the information asymmetry was lifted, in other words, as if copyright owners knew what Amazon, Apple and Google know about the effect of music on their ecosystem. And again, modelling such symmetry of knowledge is required to

model an effectively competitive rate. By comparison to these calculations, Copyright Owners' rate proposal is quite reasonable for the Services, if not below the true effectively competitive rate.

- (vii) The current streaming market reflects substantial misallocation of risk, which is fostered by the compulsory rates, and in particular the subsidization of discounts by the compulsory rate structure. Under a willing buyer/willing seller standard, there must be a risk premium placed on rates to account for the acute asymmetry of risk in this situation, and economics tells us that this would occur in a true willing buyer/willing seller negotiation. This is particularly true in light of the statutory rate standard factor that calls for consideration of relative risks in setting the appropriate rate.
- (viii) Nash bargaining analysis provides useful additional insights into the interplay of sound recording and musical works royalty rates, including by illustrating how to understand the effects of asymmetrical information and displaced revenue in the streaming industry. Breaking out displaced revenue within a Nash bargaining model in which labels negotiate the sound recording rate with the Services, taking as given a musical works rate as set by statute, shows how the inclusion of displaced revenue effectively leads to the player most able to afford an increase in payments absorbing most of any increase in the statutory musical works rate.

#### IV. The importance of economic modelling in this proceeding

##### A. Benchmarking is a valuable tool, but requires adjustment and has a blind spot where there is economic distortion

- (7) There are a variety of methodologies that the Judges can turn to in considering the appropriate statutory rate to set in the current proceeding. Two of the most prevalent are benchmarks and economic models. Here, I would like to put forward a few comments in relation to benchmarking as a tool for rate-setting.

- (8) Benchmarks can capture the myriad of real-world dynamics that modelling does not. Certainly, benchmarks can provide an appropriate starting point for considering a rate going forward, but given that the environment in the future, or even the present, is unlikely to be the same as the environment in the past when the benchmark was set, if the benchmark is to be relevant it will need to be adjusted. Even more concerning is the fact that by carrying forward the existing state of the market, unadjusted benchmarks can also reinforce existing distortions in the market.
- (9) Since the main benefit of benchmarks is that they “bake in” things that we otherwise may not be able to identify (otherwise they would not be so valuable), it is hard to argue that benchmarks should not be used at all. There are clearly benefits to appropriate benchmarks, but there are also costs since a benchmark may reflect economic conditions that are not relevant for the period, or for the market, in which the rate to be set will be used. Making appropriate adjustments to a benchmark can retain the benefits and minimize the costs.
- (10) The question then arises as to how to work out what is the appropriate adjustment for a given benchmark. It is in the adjustment process that economic modelling and benchmarking cross paths.

B. The process of adjusting benchmarks implicates economic theory and modelling

- (11) It will rarely be appropriate to adopt a benchmark in the whole, given inevitable differences between the benchmark context and the target context that called for the benchmarking exercise in the first place. As soon as you move away from a benchmark that can be adopted in whole, there is a need to adjust, and the benchmark cannot adjust itself. The critical adjustment process calls for, first, identifying the relevant economic conditions and how they are reflected in the benchmark, and then realigning the benchmark so that it is a valid representation of the economic situation corresponding to the market in which the rate will be set, rather than the market from which the unadjusted benchmark comes. This is a process involving economic theory and modelling.

### C. The century of compulsory licensing introduces historical distortions

- (12) Regulatory intervention changes market dynamics. Concretely for the case at hand, prolonged suppression of market dynamics can be expected to become entrenched. Overreliance on benchmarks, without attention to market context, can continue that arbitrary suppression, despite it being unreflective of what economic reality would be in the absence of the historical suppression.
- (13) Songwriters and music publishers have had mechanical royalty rates suppressed by a compulsory license for over a century. Compared with sound recording rates where there is not such a long history of regulatory control, mechanical royalty rates are much lower, in spite of the strong similarity of what each is licensing. Indeed, in areas where there has not been historical suppression by a compulsory rate, such as those involving audio-visual uses, the rates for musical works are much more similar to those of sound recordings.
- (14) This is not to say benchmarking is a lost cause. But in order for benchmarking to live up to its task of modelling a free market, it is essential that it examine very closely every way in which historical factors might have distorted the marketplace, and use thoughtful economic theory and modelling to adjust benchmarks to the task.
- (15) While I have not engaged in a benchmarking analysis, I have reviewed the testimony of Peter Brodsky and David Kokakis in this proceeding and would call attention to a particular set of benchmarks discussed there that I believe warrants special attention.<sup>1</sup> This benchmark involves *blanket licenses to digital services* for the *full catalogues* of music publishers to allow *on-demand* use of music in *digital platform consumer applications*. The primary difference between these agreements and the licenses in the interactive streaming market is the involvement of audio-visual uses instead of audio-only uses, which means that they fall outside of the compulsory rate.

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<sup>1</sup> Written Direct Testimony of Peter Brodsky (“Brodsky WDT”), *Phonorecords IV*, 21-CRB-0001-PR (2023-2027), at ¶¶ 80-87; Written Direct Testimony of David Kokakis (“Kokakis WDT”), *Phonorecords IV*, 21-CRB-0001-PR (2023-2027), at ¶¶ 67-77.

However, I think what we have here is a natural experiment.<sup>2</sup> The division between audio-visual and audio-only use in this context is, economically speaking, random. There is no economic reason why these modern interactive audio-only streaming uses should be under compulsory rates while their interactive audio-visual streaming counterparts are not.<sup>3</sup> As a result, comparing these cases can give us insight into the effect of the naturally-randomized treatment, which in this case is compulsory licensing, that has been applied to one side but not the other. And what is shown is that in these audio-visual cases, [REDACTED]

[REDACTED] This strikes me as very insightful as a benchmark for the proper division of surplus, and worthy of great consideration as guidance for proper rates under the new willing buyer/willing seller standard.

#### D. Current “Big Tech” dominance makes additional distortion likely

- (16) The Big Tech companies of the United States – although really, we should say the world at this point – are a unique subject. The evidence concerning the extent of Big Tech market power and information asymmetry is extraordinary and has been the subject of significant debate in the U.S. government.<sup>4</sup> This market power and information asymmetry cannot be ignored in a proceeding like this, where the majority of the streaming service market is composed of these very companies. Perhaps the most central takeaway from the House Report is that the market power

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<sup>2</sup> A natural experiment is a situation in which an event leads to a random assignment of study subjects to different groups, and which we can exploit to answer particular questions where we cannot sort the subjects into random groups ourselves. The 2021 Nobel Prize in Economics was awarded just days ago to three economists for analysis drawn from natural experiments. See “Press release: The Prize in Economic Sciences 2021,” The Nobel Prize (October 11, 2021) <https://www.nobelprize.org/prizes/economic-sciences/2021/press-release/> (subtitled “Natural experiments help answer important questions for society.”)

<sup>3</sup> One could argue that traditional audio-visual uses, in which a movie or television studio or advertiser sought a license for an individual song for use in an individual commercial project, was a different type of use. However, these modern on-demand, catalogue-wide audio-visual uses are not such a different type.

<sup>4</sup> See “Investigation of Competition in Digital Markets.” Majority Staff Report and Recommendations, U.S. House Judiciary Committee, Subcommittee on Antitrust, Commercial, and Administrative Law (October 6, 2020) (“House Report”).

and information asymmetry of these companies is so large and profound that we do not even fully understand it or its effects.<sup>5</sup>

- (17) Indeed, this is the economic quandary with informational asymmetry. By definition, one does not know the precise extent of it, and yet it *must* be factored into analysis that hopes to reach effectively competitive rates. Thus, the problem may be difficult to confront, but it cannot be ignored simply because it is too large or too hidden to be known with precision. Indeed, as discussed below, the field of economics instructs as to how willing sellers address these difficult concerns, which include building in additional protections and premiums for risk.

## V. Shapley analysis is an appropriate tool to meet the new rate standard

- (18) On now multiple recent occasions, the Judges have considered economic models developed from the work of Lloyd Shapley on game theory. Shapley’s methodology provides the unique process under which a jointly created economic surplus can be shared among those that create it, such that (i) all output is allocated, (ii) in a symmetric game players receive equal payoffs, and (above all) (iii) each player’s payoff reflects only their relative contribution to the surplus created.<sup>6</sup> An integral element of this is that, by construction, the Shapley model eliminates completely all strategic abuses of market power.
- (19) As was discussed at length in the preceding *Phonorecords III* proceeding, the Shapley methodology was quite appropriate to meet the regulatory objectives that guided that proceeding, as set out in 17 U.S.C. § 801(b).
- (20) I understand that since the *Phonorecords III* hearing, the U.S. law that guides the Judges’ deliberations changed the rate standard from the four 801(b) factors to a requirement (as applied in the *Webcasting* proceedings) that the rate encapsulates what a “willing buyer” and a “willing

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<sup>5</sup> *Id*; see also COEX-9.1 (Adrianne Jeffries, *To Head Off Regulators, Google Makes Certain Words Taboo*, The Markup (Aug. 7, 2020), <https://themarkup.org/google-the-giant/2020/08/07/google-documents-show-taboo-words-antitrust>).

<sup>6</sup> See Young, H.P. (1988), “Individual contribution and just compensation,” in Roth, A.E. (ed.), *The Shapley Value: Essays in Honor of Lloyd S. Shapley*, Cambridge: Cambridge University Press.

seller” would agree to. The Judges have further interpreted this standard to require a rate that reflects a market that is “effectively competitive.” As I will discuss, once again the Shapley methodology appears as a natural choice, both for setting a rate that is acceptable under a mantra of willing buyer/willing seller, and for setting a rate that reflects effective competition. This result should not be surprising, as the 801(b) standard included concerns that economists typically think are also reflected in fair market transactions (and which are therefore acceptable to a willing buyer and a willing seller, and by extension, which represent effective competition). These considerations include fair value to both sides of the transaction and a reflection of relative contributions.

#### A. Shapley analysis delivers a willing buyer/willing seller result

- (21) In order to consider whether the Shapley model conforms with a willing buyer/willing seller mantra, we should clarify what exactly we mean by that term. The standard economic interpretation is that a price (or “rate”) achieves a situation of willing buyer/willing seller when that price is such that both sides of the market (those supplying the relevant input – the sellers – and those that demand that input – the buyers) participate voluntarily in the transaction. No player is somehow coerced or manipulated into agreeing to participate in the transaction. Stated in other words, the players earn from the transaction a greater payoff than if they were to abandon it, or in economics parlance, each player earns from the transaction a payoff that is greater than their opportunity cost of participating. Clearly, there is a range of possible values that will satisfy the criteria of enticing the players to voluntarily participate. Shapley analysis will always deliver one such situation and will therefore always meet that core rate standard.<sup>7</sup> However, Shapley analysis has other commendable properties that indicate that it delivers not merely *an* appropriate result, but is perhaps *the* most appropriate result.
- (22) Consider the Shapley model itself, under the logical assumption that when all players are included, the business produces positive surplus (as is the case in the real world of interactive

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<sup>7</sup> In fact, there is one player in the real world that has no choice but to participate – the musical works copyright supplier. The very reason why the Judges must set a rate in the present proceedings is because there is a compulsory license for the musical works copyright. That is, the musical works copyright cannot be withheld, regardless of the value of the relevant opportunity cost.

streaming of music). First, by construction each player earns a strictly positive surplus, since the model first reimburses all of the players for the costs that they face in contributing their input to the venture, and then shares the remaining surplus among the players in such a way that each gets some positive fraction. Thus, we can be sure that all players in a Shapley model earn a strictly positive net payoff.

- (23) Next, as discussed in more detail below, the Shapley model is entirely effectively competitive, in the sense that by construction it eliminates all strategic imperfections that would lead to a player receiving a share of surplus that exceeds what would correspond to their natural payment in accordance with their contribution to the surplus. What if the natural payment in accordance with contribution is insufficient to entice a player to voluntarily be a willing participant? In other words, what if a player simply does not contribute enough to warrant a share of surplus that is higher than its opportunity costs? An even different way to phrase this is: what if a player refuses to participate unless it receives an anticompetitively high share of surplus? That is simple. A different player takes the place of the one that would only participate if receiving a share above its contribution. Why? Simply because the Shapley model offers that substitute player a strictly positive net profit. After all, that the rate satisfies the willing buyer/willing seller standard does *not* require that the buyers and sellers that end up participating are those same players that currently populate the market. On this point, I note the Judges’ recent discussion in their *Web V* determination: “Moreover, as the Judges have said on several other occasions, the statutory rate setting process does not instruct the Judges to protect any particular business model... Any rate or rate structure set by the Judges can (and likely will) affect different regulated entities somewhat differently[.]”<sup>8</sup>
- (24) I find Shapley analysis even more suited to the task in view of the specific statutory language that describes and defines the rate-setting task that is before the Judges:

The Copyright Royalty Judges shall establish rates and terms that most clearly represent the rates and terms that would have been negotiated in the marketplace

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<sup>8</sup> Final Determination, Determination of Rates and Terms for Digital Performance of Sound Recordings and Making of Ephemeral Copies to Facilitate Those Performances (Web V), Docket No. 19-CRB-0005-WR (2021-2025) (July 22, 2021) (“Web V Final Determination”), at 111.



between a willing buyer and a willing seller. In determining such rates and terms for digital phonorecord deliveries, the Copyright Royalty Judges shall base their decision on economic, competitive, and programming information presented by the parties, including –

- (i) whether use of the compulsory licensee’s service may substitute for or may promote the sales of phonorecords or otherwise may interfere with or may enhance the musical work copyright owner’s other streams of revenue from its musical works; and
- (ii) the relative roles of the copyright owner and the compulsory licensee in the copyrighted work and the service made available to the public with respect to the relative creative contribution, technological contribution, capital investment, cost, and risk.

(17 U.S.C. § 115(c)(1)(F))

- (25) I find of particular note that: (1) the rate to be set should “most clearly represent” the outcome of a willing buyer/willing seller negotiation, (2) the Judges should consider “economic” and “competitive” information in making their decision, and (3) the rate should reflect the players’ relative contribution.<sup>9</sup> Each of these factors points to the merit of Shapley analysis.
- (26) As discussed, Shapley analysis does indeed deliver a sharing rule that would be acceptable to a willing buyer and a willing seller. But even more so, it delivers that rule pursuant to axioms that also reflect the values that economists believe generally underlie fair marketplace transactions for all market participants. In that sense, its sharing rule *more clearly represents* a willing buyer/willing seller outcome than other approaches, as it is more universal. This fits with the advice of the Librarians of Congress that the rate and terms should be those to which, “absent special circumstances, most willing buyers and willing sellers would agree.”<sup>10</sup> Shapley analysis delivers a willing buyer/willing seller sharing rule that removes “special circumstances,” and is built upon principles that apply to all.

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<sup>9</sup> With respect to the substitutional effects of interactive streaming, I leave a more complete discussion of this factor to other witnesses for the Copyright Owners.

<sup>10</sup> Final Determination, *Determination of Reasonable Rates and Terms for the Digital Performance of Sound Recordings and Ephemeral Recordings*, Docket No. 2000-9 CARP DTRA 1&2, 67 Fed. Reg. 45240, 45244-45 (July 8, 2002) (“*Web I* Final Determination”).

- (27) Shapley analysis is particularly well-suited to combine with benchmarking analysis in rate-setting. While benchmarking can capture a broader swath of real-world influences, it also reflects more *anecdotal* evidence of marketplace principles at work, in the context of the particular entities in the benchmark transaction and their “special circumstances.” Further, as discussed above, the “baked in” merits of benchmarking generate a significant gap in the adjustment process, and Shapley analysis can be a useful guide to a rate that most clearly represents a willing buyer/willing seller rate.
- (28) The second piece of statutory language above also points to Shapley analysis, since as discussed below, Shapley methodology directly deals with competition issues, and installs a sharing rule that fully represents an outcome in an effectively competitive market.<sup>11</sup> This is another feature of Shapley analysis that complements benchmarking.
- (29) The third piece of statutory language above quite directly points to Shapley analysis. The Shapley model specifically identifies a rate that fully and exclusively reflects the players’ relative contributions to the creation of the surplus, along with their costs required to make those contributions. There is no other economic tool that delivers a sharing rule that captures relative contribution and costs as aptly as Shapley modelling.
1. Comparison with Nash bargaining reinforces that Shapley analysis provides a willing buyer/willing seller result
- (30) When unregulated economic agents join together to create a surplus that depends on each of their contributions, they must also agree to how share the surplus between them. The leading economic model of the process of allocation of surplus between agents which create it is the Nash bargaining model. The Nash model provides a solution that allocates all of the surplus and ensures that each player gets a strictly positive payoff, relative to their payoff from refusing to participate in the

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<sup>11</sup> In an “effectively competitive” market, players all compete on terms determined by their individual importance, or relative contribution, to the overall venture, and none are able to employ exogenously determined strategic play (abuse of market power). To take an analogy, in a footrace for Olympic medals, the winners are those athletes that are (i) most athletically gifted, and/or (ii) best trained and prepared. All underhanded strategic tactics (e.g. doping) are excluded by the rules. Thus, we can see that this is a perfect example of effective competition leading to the rewards going to the players that most justly deserve them. The Shapley methodology is the economic equivalent to fair-play rules in sports.

venture, among other very appealing characteristics. Therefore, this particular model is the quintessential framework that encapsulates a willing buyer and willing seller.

- (31) Since the Shapley value does distribute all of the available surplus among those players that jointly create it, and it gives each player a strictly positive payoff, it is true that there will always exist a standard Nash bargaining model with appropriately chosen parameter values that achieves exactly the same payoffs as the Shapley model. This is because the standard Nash bargaining model also distributes all of the surplus among all of the players and gives a positive amount of surplus to each one. And since participation in a Nash bargaining model is always voluntary, the resulting Nash payoffs do necessarily satisfy the criteria of willing participants. Therefore, so does the Shapley value methodology.
- (32) I therefore conclude that Shapley analysis is well-suited to address the appropriate rate to be set under the governing rate standard.

#### B. Shapley analysis delivers an effectively competitive result

- (33) In prior proceedings, there has been some debate around the issue of whether a rate based on Shapley values is effectively competitive. Here, I will strive to show that it is particularly evident that the Shapley model, by construction, is effectively competitive.
- (34) To begin that discussion, it is necessary to have a concrete concept of effective competition in mind. The Judges have provided a wealth of discussion on the topic. In *Web IV*, the Judges found that: “In its essence, ‘[a] workably competitive market is one not subject to the exercise of significant market power.’”<sup>12</sup> The most important word in this statement is “exercise.” Of course, market power is not by itself a competition problem. Rather, market power is necessary for giving firms the appropriate incentives to invest, so that markets are able to function well.<sup>13</sup> In a well-

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<sup>12</sup> Final Determination, *Determination of Royalty Rates and Terms for Ephemeral Recording and Webcasting Digital Performance of Sound Recordings (Web IV)*, Docket No. 14-CRB-0001-WR (2016–2020), 81 Fed. Reg. 26316, 26341 (May 2, 2016) (“*Web IV* Final Determination”).

<sup>13</sup> I note that the economics literature can be confusing on this most basic point, because economists often use the term “market power” as shorthand for “abuse of market power,” which is also often referred to as “exercise of market power.” I myself have been guilty of this faux pas, as was pointed out in the *Phonorecords III* proceedings. This often happens simply because the underlying assumption in many economic models is that rational economic agents

respected textbook on competition policy, Motta (2004, pg. 89)<sup>14</sup> states this in the following words: “The prospect of having some market power (i.e. some profit) represents a most powerful incentive for firms to innovate and invest.” Rather, the Judges’ concern is with the *abuse* of market power, which we can think of as the *strategic use* of market power to obtain a payoff that is greater than it would otherwise have been.

- (35) With that in mind, it is very useful to go back to the original underpinnings of the Shapley model. Young (1988) puts the model into full perspective with the following words: “... the Shapley value is the unique sharing rule with the following three properties; (i) Output is fully distributed, (ii) Factors that enter into the productive function in a symmetric way receive equal shares, (iii) A factor’s share depends only on its own contribution to output.”<sup>15</sup> The important element of this teaching for seeing that the Shapley value is effectively competitive is the third characteristic – that the model delivers payoffs that depend *only*, or *exclusively*, on each player’s contribution to output. That is, the Shapley payoffs do not depend in any way on anything that is *not* the direct contribution to output of each player. In particular, Shapley payoffs do not contain or represent any strategic element, such as might arise when a player abuses of a dominant market position. There is simply no space in the Shapley model for any player to manipulate the payoffs to their advantage in any way that is not fully representative of their own (and only their own) contribution to the shareable surplus. Therefore, it is quite evident that the model is perhaps the purest representation of what we might understand by effective competition.
- (36) It is the very construction of the Shapley model that delivers the result that it is effectively competitive. In the model, as partial coalitions are (hypothetically) created by adding players one after the other, each incoming player is made to fully commit their input to the combined inputs

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will exploit any and all aspects of a situation to their best advantage. That is, if abuse of market power is possible and optimal for the agent that possesses market power, these models will expect them to abuse. These models make it the task of a regulator to remove the option of market power abuse. This is, for example, the thrust of the “Market Power” chapter in the highly respected textbook by Mas-Collel, A., M. Whinston and J. Green (1995), *Microeconomic Theory*, New York: Oxford University Press, pg. 383.

<sup>14</sup> Motta, M. (2004), *Competition Policy: Theory and Practice*, Cambridge: Cambridge University Press.

<sup>15</sup> Young, H.P. (1988), “Individual contribution and just compensation,” in Roth, A.E. (ed.), *The Shapley Value: Essays in Honor of Lloyd S. Shapley*, Cambridge: Cambridge University Press, pg. 268.

of the players already present. There is no ability for a player to withhold their input and not supply it to the coalition. There is also no ability for a player to somehow wait until all other players have committed their inputs before theirs is added. The players that are already present in the coalition in question have already committed their inputs, and the new arrival then simply adds their input upon arrival.

- (37) Finally, much of the fear that abuse of market positions will wreak havoc upon a competitive outcome is based upon anti-competitive price-setting behaviour (for example, players working together as a cartel to price anti-competitively) and complementary oligopolists that (combined) charge well above marginal cost. However, there is absolutely no place for price-setting in the Shapley model – each player’s payoff is fully determined by their Shapley value, not by that player somehow setting a price. This, once more, tells us that in the Shapley model there is no opportunity for any player to act in any anti-competitive manner. Thus, the model is fully effectively competitive.
- (38) This conclusion is confirmed by the reasoning in the Dissent opinion in *Phonorecords III*, in discussing the adjustment by Dr. Marx to combine services into a single player to eliminate complementary oligopoly power:
- “...the Shapley value approach, without any adjustments for market power, eliminates... the complementary oligopoly (“must have”) effect, through its use of all “arrival orderings,” indicating the outcome of an effectively competitive market.” (emphasis added).<sup>16</sup>
- (39) This reasoning correctly captures the economics involved.<sup>17</sup>

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<sup>16</sup> Final Determination, *Determination of Royalty Rates and Terms for Making and Distributing Phonorecords (Phonorecords III)*, Docket No. 16-CRB-0003-PR (2018-2022) (Nov. 5, 2018) (“*Phonorecords III* Final Determination”), at 137 n.184 (dissenting opinion).

<sup>17</sup> *Id.* The Dissent also found, in this same footnote, that the former Section 801(b) Factors B and C might still not be satisfied by the Shapley model. While I respectfully disagree with that conclusion, my understanding is, as discussed above, that the former Section 801(b) factors do not bear on this proceeding.

- (40) Indeed, in the determination of *Web V* (pg. 181-185), the Judges concluded that modelling choices themselves can lead to a result that does not reflect effective competition.<sup>18</sup> Shapley models that utilize modelling choices that misrepresent the industry, such as those that have artificially created necessity and market power where there is not any in the real market, can fail to reflect competition *accurately*. Still, there cannot be any abuse of market power in Shapley models, and so Shapley models do reflect effective competition. Criticisms of Shapley modelling should be about whether the model concerned inaccurately represents the market being modelled, and not about whether it delivers results that do not reflect effective competition. The former is quite possible, but the latter is not.

## VI. Understanding how Shapley modelling works

- (41) Below, I set forth a robust Shapley analysis to model the interactive streaming market. Details on the construction of the model and the formulas involved are laid out in Appendix C. I review multiple sets of assumptions concerning the structure of the market players, the costs, and the revenue generated by cohorts within each arrival ordering. I discuss the different moving pieces, and the impact of changes in assumptions and empirical variables. What my analysis shows is that, regardless of how one views the dynamics between record companies and services, the entities being regulated in this proceedings, music publishers and songwriters, deserve to see a substantial rate increase. I also explain the striking effects on predicted division of surplus of the shift in the streaming industry to large services with diversified businesses.
- (42) The model that I have developed follows exactly the standard and universally accepted Shapley process. This begins by defining the set of players, in our case the maximum number of each of three types of players, namely services, record companies, and music publishing companies. Next, given the players, the collection of all possible sequential orderings of them is set down, and those are used as the different “arrival orders” for how the players “enter” the game. At each step along the way, the set of players who have entered is referred to as a “cohort” or “coalition,” and each such cohort creates some amount of surplus in the market (revenue that is generated,

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<sup>18</sup> *Web V* Final Determination at 181-185.

less the costs incurred by the cohort members). Once all of the players have arrived, the cohort is referred to as the “grand cohort,” and this is what we observe in the real-world. As each player enters, they get allocated to them all of the marginal surplus generated by their presence, that is, the difference between the cohort surplus once they have arrived and the cohort surplus immediately prior to their arrival. The first player typically gets nothing, even if they are necessary (because they are not also sufficient). The first player to enter who creates a coalition that generates surplus “gets” that surplus, if the next player generates more surplus, they “get” the marginal additional surplus, and so on. Being the last player to join can be the most lucrative position for the owner of a necessary input (an input without which no surplus is possible). In such a situation, there will be no surplus until the final, necessary, player joins, and so that player will obtain (in that particular arrival ordering) all of the surplus. However, each player will be the first player (getting nothing) exactly as often as they will be the last player. Moreover, if a player is substitutable for another player, being the last player to enter may not be preferable since the profitable coalition has already been created and is off doing the business already.

- (43) It is important to remember that the surplus in all of these coalitions is the profit, not the revenues. As standard economic theory requires, appropriate costs are reimbursed first, because no party would enter into a coalition if they did not earn a positive profit. As a result, in order to run a Shapley model, it is necessary to model costs as well as revenues.
- (44) Nevertheless, it is important to recognise that surplus here is more than just current period accounting profits. Rather it is the discounted value of all expected future profits. There are two important issues here. First, it is mistaken to simply take the current period accounting profits as the level of surplus in a Shapley model, simply because real-world firms do not maximize their current period profits, but rather they act in order to maximize discounted future profits.<sup>19</sup> This is why many companies continue to operate at an accounting loss for extended periods. Second, the Shapley cohort surplus is (the discounted present value of) all surplus generated. This surplus is shared by the cohort, so that the cohort is modelled as a joint venture or enterprise. In particular,

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<sup>19</sup> On this point, one is referred to any reputable corporate finance textbook, such as Lumby, S. and C. Jones (2015), *Corporate Finance: Theory and Practice*, Cengage Learning (9th ed. 2015).

no player gets to take their surplus, or part of their surplus, which is generated by the team, off the table. As a result, there is a need to properly capture and include as shareable over the cohort members the entirety of the revenues earned, and this may include revenue that is directly related to the particular product or service at hand, as well as revenues that are only possible because of the venture, but that accrue indirectly to one player.

- (45) Finally, in order to run an appropriate Shapley model, it is necessary to model the necessity of each of the players. This is captured by the way they enter into the revenue generating process, and in particular, by the degree to which a player may or may not be substitutable in the revenue generating process by some other player of the same type. Details of this are fully set out in Appendix C and are exemplified in the following section.

## VII. Understanding Shapley modelling choices

- (46) All economic modelling requires making choices about the market to be modelled. These choices seek to distil and represent important features of the market. Below I discuss different model inputs and the impacts of different assumptions on the sharing rule that the model delivers. I then run the model using different combinations of choices to show the results under such different choices, also providing a sensitivity analysis.<sup>20</sup>

### A. Modelling the players

- (47) The first choice to be made is which players to include in the model. This proceeding is to set royalty rates for streaming services that want the rights to use songs embodied in sound recordings in interactive streaming. The relevant groups of players negotiating in this market are the streaming services, the licensors of songs and the licensors of the sound recordings.<sup>21</sup>

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<sup>20</sup> A sensitivity analysis as employed here involves running multiple “what if” scenarios in order to test how changes to the input variables impact the results delivered by the model.

<sup>21</sup> As I discussed in my *Phonorecords III* rebuttal report, it is not useful to add players outside of the interactive streaming marketplace into a Shapley model. Remand Written Rebuttal Testimony of Richard Watt, *Phonorecords III*, eCRB Docket No. 25425, July 2, 2021 (“Watt RWRT”), at ¶27. Doing so only has the effect of distorting the result of the Shapley model, and distancing the model from capturing on the contributions of the players that are legitimately involved in the interactive music streaming market.



## 1. Music publishers

- (48) I understand that a ruling by the Librarian of Congress in the first *Webcasting* proceeding explained how the hypothetical negotiation should be framed under the willing buyer/willing seller standard:

In this configuration of the marketplace, the willing buyers are the services which may operate under the [compulsory] license, the willing sellers are record companies, and the product consists of a blanket license from each record company which allows use of that company's complete repertoire of sound recordings.<sup>22</sup>

- (49) I particularly note the reference here to the product being the “complete repertoire.”<sup>23</sup> This confirms to me that the analysis of proper rates should not seek to disaggregate the catalogue value of music publishers (or record companies) or otherwise lessen the necessity or bargaining power that they have from having assembled catalogues of works.
- (50) The market has many music publishers and self-published songwriters, far too many to model each separately. As discussed below, I run models with a range between one and three, and I believe that modelling a market with more than one publisher, and an equal number of publishers as record companies, is the most appropriate and *conservative* choice. As the Judges surely know, music publishing catalogues do not line up with sound recording catalogues. As a result, a sizeable sound recording catalogue will require rights from all sizable music publishers. In this sense, I think there is a strong case that music publishers are the most necessary entities for consumer streaming products.
- (51) To see this, consider the effects of removing the catalogue of one of the sound recording companies. This would remove whole artists or albums from services and render portions of the services' catalogues incomplete. But removing a music publishing catalogue would remove many individual sound recordings from many different albums and artists, in effect rendering incomplete all aspects of a services' music catalogue. Arguably, removal of a publishing

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<sup>22</sup> *Web I* Final Determination at 45244.

<sup>23</sup> While this ruling is related to sound recording licensors and rates, I understand that the standard is the same in this proceeding with respect to mechanical licenses for the use of musical works.

catalogue has a greater effect on the music product that a service can offer than would be the removal of a recording company catalogue.

- (52) In the model that I have developed, my preferred structure is to have three music publishers along with three recording companies and three streaming services. This is a balanced structure, with no benefit provided to any player type, or relative cost imposed upon them simply for being assumed to be more or less numerous than the rest. However, I also provide alternative models with only a single publisher.

## 2. Services

- (53) The interactive streaming market in U.S. has many active services, but the market is dominated by four, namely those operated by Spotify, Amazon, Apple and Google. I run models with a range of services from one to four, to show the dynamics of increasing or decreasing the number, and this range is adequate to accurately deliver the model's insights.

## 3. Record companies

- (54) The market has many record companies, far too many to model each separately, but there is no need to do so, since the model will capture the sharing rule with a much smaller range. There are three “major” labels (Sony Music Entertainment, Universal Music Group and Warner Music Group), and at least one large association of independent record companies (MERLIN). I run the models with a range from one to four record companies, which will show the dynamics of increasing or decreasing the number.

## B. Modelling substitutability and necessity

### 1. The Services are highly substitutable

- (55) In the recent *Web V* determination, the Judges found that the services are “highly substitutable”, describing the services as “mere monopolistic competitors.”<sup>24</sup> In the standard theory of

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<sup>24</sup> *Web V* Final Determination at 14 n.24.

monopolistic competition, firms are assumed to offer slightly differentiated versions of an otherwise homogeneous product. There is free entry and exit from the market, and this results in the firms earning no long-run profit at all. Given this perspective on the nature of the interactive streaming market, which I concur with, the services in the Shapley model that I have developed can be included so as to be highly substitutable one for another.

- (56) The Services must be modelled as multiple entities with substantial substitution to reflect the actual market. Otherwise, we would be contriving a market that is far more favourable to the Services than reality, *after* controlling for any exercise of market power, which would most certainly violate the rate standard.
- (57) Nonetheless, I do include a model showing the Services modelled as a single player, in order to demonstrate that even in this situation, granting far more market power to the Services than they have, the model indicates a substantial increase in the mechanical royalty rate.

## 2. Music publishers are not substitutable

- (58) As discussed above, music publishers hold a quite irreplaceable position in this market. Their work aggregating disparate copyrights not only reduces transaction costs dramatically, and their catalogues are used by the full spectrum of labels, artists, albums and genres, such that even streaming the sound recording catalogue of a single major label would require all of the more sizable music publishing catalogues.
- (59) To be conservative, I model the necessity of the music publishers in the same way as I do the record companies. I do not attempt to capture the heightened necessity by virtue of their catalogue breadth, despite that it may exist. As discussed below, this includes both a relatively low (but not zero) substitutability and also a more nuanced modelling of a “must have” nature, and both of these assumptions are tested with alternative modelling as well.

## 3. A “must have” nature of large record companies is a feature, but it is different than has been previously modelled

- (60) It has been repeatedly discussed throughout recent CRB proceedings on rate-setting for distribution of music that licenses for the catalogues of the three “major” labels (Sony, Warner

and Universal), and perhaps certain of the “Indies” as well, are all required if a streaming service is to be able to compete profitably.<sup>25</sup>

- (61) Given the highly substitutable nature of the services, which it appears that everyone agrees to be the case, it is appropriate to model record companies as having a particular type of necessity for services. However, this necessity is more nuanced than simply an assumption that all existing major record company catalogues must be present for there to be any profitable streaming business model. We must not lose sight of the fact that the necessity of having *all* record company catalogues stems in large part from the business models *of the services*. In other words, the services have chosen to not compete on price in the upstream market. The services, to my understanding, are not offering higher royalties to sound recording licensors to obtain exclusive sound recording content, thereby raising their products above the highly-substitutable offerings that they are, as is done in most other markets, such as the adjacent video streaming space or podcast space.<sup>26</sup>
- (62) As a result, the particular urgent need of an individual service to have record company catalogues is entirely to keep up with its competitors. Because the streaming services have chosen to build products that are largely commoditized, they must keep up with their competitors on the basic scope of the product or risk falling out of the competition completely. Thus, a streaming service has a particular urgent need for a major record company catalogue *where one of its competitors has that catalogue*. If a record company catalogue was unavailable for *all* services, then it would not be necessary for any particular streaming service. To be clear, the loss of the catalogue would affect the value of the streaming offerings, and therefore the revenue that the enterprise generates, but this is an incremental detriment across the industry as a whole, rather than the existential

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<sup>25</sup> This may not be true for niche streaming services, but my understanding is that niche services represent a minute share of the streaming service market, and so should not be the basis for modelling the market.

<sup>26</sup> In a market in which streaming firms were to compete on more general terms, we would expect to see distributors seek exclusive content in order to better differentiate their own service from the others, and gain pricing power over their competitors. That is, we would expect to see far more differentiated services than what currently exists. Under such a vision of the business, the services would offer different products, thereby no longer being commodities that earn no profit from their streaming products.

problem for individual services of having a commoditized product that no longer meets the basic product function of competitor products.

- (63) Again, Shapley analysis controls for exercise of market power by requiring all players who are present to join the coalitions (and to supply their input) along with all other players (and their inputs) in that coalition. So, Shapley analysis will entirely eliminate the abuse of this “must have” power. However, previous Shapley models have artificially reinserted the power in a distorted way through a different assumption, namely that no Shapley cohort earned revenues until all record companies were present in the coalition. But we see that this is not the case. If a single record company withdrew from licensing its catalogue to *all* streaming services, this would not eliminate all revenue from streaming.<sup>27</sup> Again, it would lessen the size of the catalogue and thereby could lower the consumer product value and revenues generated, but would not eliminate all revenues. By including all record companies as absolute must-have players in the sense that they are all required before any profit is generated, the model would needlessly allocate to the record companies an incorrect dominant market position, with the corresponding, equally incorrect, decrease in importance of the other players.
- (64) So, to recap, the Shapley model by its nature requires any record company that is present in a coalition to license to every service present in the coalition (and at licensing terms that are determined by the final Shapley outcome, not by the record company itself). This eliminates any abuse of the record company’s “must have” power. The “must have” power is more nuanced than simply that no one earns any surplus until every record company is present. As a result, we should include in the model the (smaller) surplus that is generated in coalitions when only some record companies are present.

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<sup>27</sup> Of interest on this understanding of the market is that the Beatles catalogue was famously not available on any streaming platform until late 2015, which did not limit the viability of streaming platforms. See COEX-9.2 (Joe Coscarelli, “Beatles Catalog Goes on Streaming Services,” *New York Times*, December 23, 2015, <https://www.nytimes.com/2015/12/23/arts/music/beatles-fans-start-your-streaming-playlists.html>).

- (65) Thus, with respect to partial coalitions, the model that I have developed allows for profitable music streaming in a partial cohort, so long as that cohort has at least one streaming company, at least one record company and at least one musical works copyright holder.<sup>28</sup>
- (66) Beyond this advance in modelling partial cohorts, the Shapley analysis below also allows for assumptions as to the general degree of substitutability of each player, and I model multiple different assumptions of such substitutability for both the licensors and the licensees to explain the effect of the choice on the results.

### C. Modelling revenues

#### 1. Partial cohort revenue

- (67) The revenue that an interactive music streaming industry generates will depend upon the amounts of the inputs (e.g. the numbers of services and record companies) that are present in the venture. For the Shapley model, it is therefore necessary to model the amount of revenue that is generated for every partial coalition, or cohort, of the full set of players. The way this is done in the model that I have developed is fully explained in Appendix C. Nevertheless, it is worthwhile to quickly go over some of the most salient features of the model here.
- (68) In the actual interactive music streaming industry, the players are all participating at once, which is what I call the “grand cohort” of players. The Shapley model is designed to share the revenue of the grand cohort among the players involved according to the relative contribution that each player makes in the generation of that grand cohort revenue. In order to do that, it is necessary to evaluate how much revenue would (hypothetically) be earned by an industry in which some of the players are absent, i.e. the revenue for the partial cohorts of players. This is done by recognising that the revenue of any partial cohort cannot surpass that of the grand cohort, and in most cases the partial cohort revenue will be strictly smaller than the grand cohort revenue.

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<sup>28</sup> Notwithstanding that, the model that I have developed is also able to calculate the Shapley revenue sharing payoffs that correspond to an assumption of no revenue is possible unless all of the record companies are present in a coalition. These calculations are provided in order to give a comparison model based on prior understandings of what is a “must have” record label, and not because I believe that sort of “must have” assumption is appropriate.

Therefore, for any given partial cohort, it is recognised that the revenue will be some fraction of the grand cohort revenue. The model I have developed establishes what that fraction should be, according to; (i) how many players are present in the cohort, (ii) the identity of the players (i.e. their player types) present in the cohort, (iii) the degree of substitutability or complementarity between players of a given type, and (iv) the assumption made on the “must have” nature of record company catalogues (as described above).

- (69) My model calculates the revenue earned by a particular cohort of players using what is probably the most commonly used, and universally accepted, mathematical formulation in all of economics for modelling how inputs generate outputs. The function in question is known as the Cobb-Douglas function. Thus, in a sense my model can be interpreted as one in which inputs (measured by the numbers of services, record companies and publishers in a given cohort), combine to “produce” revenue. The Cobb-Douglas function (which is embedded within a great deal of literature dealing with many different applied economics problems) provides a general, and natural, way in which the relationships between inputs, and the degree to which there is diminishing returns to inputs, can be captured such that they provide a very close empirical fit to actual situations in which inputs are employed to generate an output.<sup>29</sup> Further detail on the use of this production function is discussed in Appendix C.

## 2. Displaced or parallel revenue as an issue of asymmetric information

- (70) In order to indeed offer a fair and effectively competitive revenue sharing arrangement that properly encapsulates the willing buyer/willing seller mantra, the Shapley model should include all of the revenue that is ascribed to the operation of an interactive music streaming service. It would not be effectively competitive if only a part of that revenue is made available for sharing among the players, and the rest is kept by only one player (or one player type). Therefore, while the revenue that is earned by the industry from subscribers and advertisers should obviously be included, these comprise only some fraction of the actual revenue, and therefore the actual

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<sup>29</sup> The Cobb-Douglas functional form is not restricted only to production types of problems. For example, the Judges may recognize that in the Nash bargaining problem, the solution is found by maximizing the “Nash product,” which also takes exactly the Cobb-Douglas form.

surplus, that the interactive music streaming industry earns. It has been repeatedly recognised that when the streaming services are diversified companies rather than “pure plays,” the operation of their interactive streaming service contributes, perhaps importantly, to the revenue that they earn from other, complementary, business lines within their firms. If the model is indeed to reach an effectively competitive result, all of the income, direct and indirect, needs to be made available in the shareable revenue pool. The model that I have developed allows for all of the net revenue to be included and shared among the interactive music streaming players, and it allows for a variety, or range, of values of the net revenue that is not explicitly captured by the direct subscription and advertising revenue, to be used.

- (71) This net revenue, which I call “parallel” revenue or “displaced” revenue, represents money that is generated as a result of the interactive streaming joint venture, and thus it relies upon the exploitation of the copyright holders’ inputs, but is not currently shared with the copyright holders. Even though it is not shared in the same way as direct subscription (and advertising) revenue is shared, it is nevertheless surplus that is generated from the interactive streaming business. The Shapley model, logically, is set up to provide a sharing rule that represents a fair compensation for the contributions of the different players in generating *all* of the surplus, not just a part of the surplus.
- (72) On this point, it is particularly salient to also remember that the Big Tech companies comprise the majority of the market (and growing). As discussed above, I understand that the rate standard calls for the setting of rates that “most” willing buyers and willing sellers would agree to. “Most” in this situation must refer to the majority of the market, as there is no other reasonable economic interpretation. It could not, for example, refer to a sort of numerical count of entities who *might* be willing to buy or sell, if only because one could never identify what the total count of entities would be so as to determine what “most” would be. The majority of the market is made up of diversified platform companies, and by Big Tech platforms alone. (And this is the same result as if one took a numerical count of the buyers who participate in this proceeding.) Rates set under the new rate standard must thus meet the revenue sharing that would occur with these Big Tech companies, who are and stand to remain (if recent history is any indicator) most of the willing buyers in the market for the coming rate period.



- (73) The fact that a revenue allocation, or sharing, model should include all of the surplus that the joint venture generates is a basic principle underlying all of bargaining theory, and indeed underlying all of the theory of how markets operate under conditions of effective competition. Any situation in which a player is able to unilaterally claim any fraction of shareable revenue (or shareable surplus), outside of the actual bargaining or market process itself, cannot be considered to be effectively competitive. It would be, essentially, equivalent to a scenario in which all surplus is shareable, but one particular player is able to strategically manipulate the allocation process itself in order to retain a larger share of the resource to be shared than otherwise. Indeed, any sharing model that excludes a part of the overall surplus to be shared from the sharing pool, allocating instead that part of surplus directly to only one player, is an outcome that can always be *exactly replicated* in a model in which all surplus is shareable but the benefitted player is allowed to strategically abuse of some form of market power against the will of the other players, in order to receive a larger share of the pool than otherwise. Since such a market is clearly not effectively competitive, neither is a sharing model in which one player unilaterally lays claim to a part of the surplus that the venture generates, before any actual sharing takes place.
- (74) The exclusion of net revenue that is directly dependent upon the operation of the interactive music streaming service occurs due to a particular form of market failure known as asymmetric information. A “market failure” is any element that impedes that the equilibrium of the market is Pareto efficient.<sup>30</sup> Mas Collé, Whinston and Green (1995, pg. 350) define market failures concretely as “situations in which some of the assumptions of the welfare theorems do *not* hold and in which, as a consequence, market equilibria cannot be relied on to yield Pareto optimal outcomes.”<sup>31</sup> One such market failure is a situation of asymmetric information, in which one

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<sup>30</sup> A Pareto efficient market equilibrium is one that lies on the “core” of the economy. There is a wealth of economic research that analyses the way in which the presence of asymmetric information leads to solutions that do not lie on the unrestricted core, but rather on a “second-best” core involving inefficiencies. For example, see Wilson, R. “Information, Efficiency and the Core of an Economy,” *Econometrica* 46(4), pp. 807-816 (1978); and more recently, Vohra, R. “Incomplete Information, Incentive Compatibility and the Core,” *Journal of Economic Theory* 86, pp. 123-147 (1999); Serrano, R., R. Vohra and O. Volig (2001), “On the Failure of Core Convergence in Economies with Asymmetric Information,” *Econometrica*, 69(6), pp. 1885-1696.

<sup>31</sup> Mas Collé, A., M. Whinston and J. Green (1995), *Microeconomic Theory*, New York: Oxford University Press (1995). The fact that asymmetric information is a market failure is also covered in the textbook by Michael Katz and Harvey Rosen (1991), *Microeconomics*, Irwin. They discuss this particular market failure as an issue in incomplete markets (i.e. markets that don’t exist): “[A]symmetric information can destroy a private market ...” (pg. 438).

player privately holds relevant information that is not shared with the other players. As was originally shown by Akerlof (1970), this type of situation often leads to valuable transactions not taking place, with the corresponding loss in market efficiency.<sup>32</sup> When a market failure, such as asymmetric information, stands in the way of market efficiency, the outcome can no longer be classified as one of effective competition, since the player with the privileged information plays at a distinct competitive advantage over the others.

- (75) Perhaps the main reason why the services' parallel net revenue pool is not shared is that it is difficult to get a reliable measure of how large it actually is. This is clearly an issue in asymmetric information – the streaming services themselves *are* aware (or certainly much *more* aware) of how much parallel income is generated by interactive streaming throughout their entire business ecosystem, but the other players in the market are not. As the Shapley model examples that I give below clearly show, the exclusion of this parallel net revenue can dramatically distort the predicted willing buyer/willing seller rate in favour of the services. Sweeping the issue under the carpet, or excluding parallel income from consideration because it is hard to calculate precisely, is a particularly inappropriate choice when the rate standard provides for a rate that represents the contributions of the different players to *all* of the surplus that is created from interactive streaming of music. Including a best estimate of parallel net revenue in the calculation of the total revenue that derives from interactive music streaming is more appropriate, and as shown below, the result of such an estimate is to deliver the copyright owners a higher participation in that fraction of total revenue that is actually counted within the “shareable pool.” Otherwise, the rate that is set cannot be considered to be reflective of an effectively competitive market outcome.
- (76) The existence of parallel net revenue that is not included in the sharing pool has effects over and beyond the strict Shapley analysis that I provide here, but that are still relevant to the present proceeding. In a pure bargaining setting between record companies and services, adding information about parallel income into the model provides useful insights into the interplay of the bargained outcome and the interpretation of the relative bargaining powers of the players. In

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<sup>32</sup> Akerlof, G. (1970), “The Market for Lemons: Quality Uncertainty and the Market Mechanism,” *Quarterly Journal of Economics* 89, pp. 488-500. Mas Collé, Whinston and Green (1995, pg. 436) specifically consider asymmetric information to be counter to the assumptions of the welfare theorems, and thus to be a market failure.

Appendix E, I provide a Nash bargaining model in which, given a statutory mechanical rate, a record company and a service negotiate the sound recording royalty, to illustrate the effect of parallel income earned by the services. When the parallel income is revealed in the model, we can follow two different paths to understand how to interpret parallel income with respect to bargained outcomes. In one scenario, if we reveal parallel income but hold the bargaining power constant, we will see an increase in the negotiated sound recording royalty. This reflects what we expect to happen when bargaining parties are informed about additional surplus—namely, they will claim their share of that additional surplus, along the usual splits. In the second path, we reveal the parallel income and consider that the negotiated royalty does not change. In this scenario, we must reassess the bargaining power assumptions to conclude that the record company involved has a lower than otherwise estimated bargaining power parameter.

- (77) This dynamic relates to what came to be discussed in the *Phonorecords III* remand proceeding as the “see-saw” effect. Note that neither of the two paths above changes the fundamental insight that bargaining theory teaches, namely that any decrease in joint venture surplus due to raising the statutory mechanical rate to market rates will be borne by either the services, the record companies, or the consumer (by virtue of more appropriate pricing) along the same proportions as the players originally split surplus. And if the mechanical rate were raised above the market rate, then the musical work copyright owners would bear some of the increase as well, through voluntary deals below the statutory rate.

### 3. Risk, risk sharing and deferred revenue

- (78) The legal standard that the Judges should apply for deciding upon a rate for the mechanical license explicitly mentions that a factor to take into account is how the parties participate in bearing the risks of the business. There are three concrete areas of concern in that regard, which I will explain here, all of which counsel that the appropriate willing buyer/willing seller rate must be calculated to include a risk-premium<sup>33</sup> for the risks that the copyright holders are made to bear – risks that

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<sup>33</sup> A risk-premium is an additional non-risky payment that should be received when a player undertakes risk, in order that the player is properly compensated for the moral costs of that risk. See Katz. M. and H. Rosen (1991), *Microeconomics*, Irwin, page 190; “This extra return to compensate for risk is called a risk-premium.”

in a willing buyer/willing seller environment would be shared by means of the player bearing most the risk being financially compensated for doing so by the player bearing less of the risk.

- (79) I note here also that this risk-premium is not one that would already be “fully baked” into free market benchmark agreements, because one of the ways that licensors in the free market, such as the record companies, will address risk is by only providing short-term licenses. This mitigates (although does not eliminate) risk by allowing the licensor to frequently revisit the terms of the license to address market or business model changes. The Judges do not have this option, but are required to set license terms for a five-year period that does not even begin until well after the time of the gathered benchmarks. My understanding is that such a lengthy term is far longer than the typical free market music streaming license, which emphasizes that the need for estimating and applying this risk-premium as part of a willing buyer/willing seller rate cannot be assumed away.

(a) *The services unfairly force copyright holders into risky investments by deferring revenue*

- (80) One area of concern for the copyright holders is revenue “deferral,” or the practice of services deliberately setting discounted subscription fees in the present in order to fight for market share and increase their user base, perhaps in the hope that higher revenues can be earned in the future (or perhaps in pursuit of current or future parallel revenue). This practice reduces current streaming revenue in the interests of potentially higher revenues later on (or displaced revenues). In essence, it is a form of investment, involving current costs (in the form of lower current revenue) in exchange for potential future benefits, and as with any form of investment, it is an exchange of certain (i.e. non-risky) present wealth for risky future wealth. However, there are problems in doing this when revenues, both present and future, are shared among more than one party.
- (81) Different economic agents will have different perspectives on any sort of investment, especially one that implies risk. Agents with greater risk aversion will certainly prefer smaller participation in risky investments, possibly no participation at all. In the case of the revenues from interactive streaming of music, many of the copyright holders are small enterprises, often even single people

(songwriters, musicians, etc.), who rely heavily upon licensing income in the present for their day-to-day lives. Such individuals are likely highly intolerant to income risk and would not willingly accept to reduce their current income in exchange for a potential, risky, future income.<sup>34</sup> However, the practice of revenue deferral by the services obliges the copyright holders to accept exactly that trade-off. This is an intolerable situation of inefficient risk-bearing. In a true willing buyer/willing seller scenario, the services would have to compensate the songwriters to make up for the risk imposed on the songwriters from revenue deferral practices.

(b) *The copyright holders are made to provide free insurance to the services for deferred revenue risk*

- (82) On top of the misallocation of risk that occurs when one party makes investment decisions that affect other parties, there is an even more concerning issue in regard to risk bearing when revenue deferral takes place. To illustrate the issue, I will take the specific case of Spotify. A cursory glance at the market share price of Spotify, along with the information that Spotify reports accounting losses every year, points to an apparent paradox. How can a seemingly unprofitable company register such huge gains in market value, year after year? The answer, however, is not hard to see. Spotify's share price reflects the market's estimates of future earnings, not of present earnings.<sup>35</sup> The subscriber base of Spotify has increased, year upon year, and this subscriber base growth, which is heavily reliant upon the current subscription price, is what drives the market's expectation of Spotify's future profitability, and correspondingly, the gains in the share price. The importance of this point is that the owners of Spotify are able to realise, *in the present and with no further risk at all*, the expected future gains (discounted to present value) that come with their current investment in subscriber base. That is, because the value of expected future earnings is baked into the share price, the owners of Spotify receive the actual expected value of the investment *in the present*, without having to wait for the future roll the dice to see whether or not

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<sup>34</sup> It is a well-established, and universally agreed axiom that the risk aversion of economic agents decreases with their wealth. This is a feature known as "decreasing absolute risk aversion." It is unquestionable that the services, most of which are huge corporations with extraordinary wealth, will be far less risk averse than songwriters.

<sup>35</sup> This is a fundamental axiom of standard corporate finance. See, for a simple text-book analysis, Lumby, S. and C. Jones (2015), *Corporate Finance: Theory and Practice*, Cengage Learning (9th ed. 2015). Specifically, on page 11, Lumby and Jones set down that "[S]hares derive their stock market price on the basis of the sum of the future dividend flow that they will produce through time."

the expected gains actually occur. But the copyright holders do *not* have that same ability – they must wait for the future to see what revenue gains are actually forthcoming from the current investment. The copyright holders retain all of the risk, and Spotify retains essentially none of the risk. In terms of the economics of insurance, the (highly risk averse) copyright holders are being made to provide full insurance coverage to the (far less risk averse) streaming service, and all because of a unilateral investment decision controlled by the service. This situation truly conflicts with efficient risk-bearing. Efficiency requires either the opposite risk exposures over the parties concerned *or* that the beneficiary of the insurance (the services) pay the actuarially fair risk-premium to the party undertaking the risk (the copyright holders).<sup>36</sup>

- (83) The onus is upon the Judges to correct for the risk-bearing imbalance related to revenue deferment that is imposed upon the copyright holders, by compensating them for the additional risks that they are made to endure when the services engage in revenue deferral practices. The licensing rate that is set should reflect not only the contribution of the copyright holders to the generation of current revenue, but it should also include a payment equal to the risk-premium of the copyright holders in compensation for the insurance that they are, unwillingly, made to provide to the services.

(c) *The royalty risks of individual songs need to be shared*

- (84) The issue of deferred revenue is not the only grossly unfair risk sharing feature of interactive music streaming that the Judges should address. It is also true that the very business model

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<sup>36</sup> In reality, this will be a mind-bogglingly large amount of money. For example, Katz, M. and H. Rosen (1991), *Microeconomics*, Irwin, page 198, remind us that “[F]or an actuarially fair insurance policy, the premium for \$1 worth of insurance is simply the probability of the “bad” state of the world occurring.” While we have no evidence of exactly how much the “bad” state of the world is for Spotify’s market cap as compared to the “good” state of the world, we are clearly dealing with many tens of billions of dollars. Even if the difference for Spotify is conservatively estimated at \$10 billion in the value of the company as measured by the share price over a 5-year window, then even a very small probability of the “bad” state of the world, say 10%, would imply a risk premium of at least \$1 billion over that period. That is, Spotify should be willing to pay at least \$1 billion to fully insure the difference between a market cap increase of \$50 billion and a market cap increase of \$40 billion over a 5-year period, where the lower outcome occurs with probability 10%. All I intend to show with this example is that the risk burden that the services shift onto the copyright holders is very valuable, and the risk-premium would be a part of a willing buyer/willing seller negotiation and should be taken into account by the Judges, whether through a direct assessment of risk or as an adjustment upwards in the range of reasonable rates that the Judges consider as mechanical rates without taking into account the risk exposure problem.

involved places all of the risk of the success or failure of the songs in a services' catalogue upon the copyright holders, and none of this risk is borne by the services. In this way again, the copyright holders effectively provide insurance to the services.

- (85) Consider how the interactive music streaming business model operates. First, a song must be composed, which incurs costs for the songwriter/music publisher. Then the song must be performed and recorded, incurring costs for the artist/record company. Up to this point, no revenue has been generated, although significant costs have been incurred up front. Finally, the song is released to the music streaming services for distribution to subscribers. But the service pays effectively nothing to host the song among the many millions of songs in the catalogue. The service does not, before the song is uploaded to a service repertoire, purchase the right from the copyright holders to include the song in its catalogue. If the song is successful, then all of the parties in this entire process should enjoy financial benefits – the song creators, the publishers, the record companies, and the streaming service. But if the song is not successful, then the negative effect is only felt by the creators, publishers, musicians, and record companies. The streaming service is unaffected by having another song in the long-tail of less streamed works in its catalogue.<sup>37</sup>
- (86) Interactive streaming of music is a joint venture between all of the parties in the value chain, and all of them should therefore share in the risks involved in the business. The way it works right now, the services essentially get to free-ride on the success lottery of every song in their catalogue – it is as if one could purchase a lottery ticket after it is known to be a winner. There is no downside to the services of an unsuccessful song. Since the sound recording rate is negotiated, it would be expected that the record companies do bake a risk-premium into the negotiated rate, that is, a higher fraction of revenue is demanded to compensate for the risk borne by the record companies

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<sup>37</sup> Importantly, these songs that reside in the “long-tail” of the catalogue offered by a streaming service provide significant value to the service. The option of access to long-tail songs is essential to the competitive success of a service, as is explained by former Spotify Chief Economist Will Page in his recent book, *Tarzan Economics* (pp. 99-110). See Page, W. (2021), *Tarzan Economics: Eight Principles for Pivoting Through Disruption* 110 (UK: Simon & Schuster) (“[M]oney cannot be made in the tail, but you can make money off the tail.”). Particularly given the value of long-tail songs for a service, and the desire of the services to obtain access to those songs for their catalogues, it is only right that services should participate in the cost of the risk of creating all songs that are in their catalogues, not only the successful ones.

in making sound recordings available. The songwriters and composers, and the publishing companies, do not have that same ability. This is another reason why the Judges should adjust upward the current statutory rate so as to include a risk-premium to correct for the unfair risk sharing arrangement that currently exists.

#### D. Modelling costs

- (87) The Shapley model is sensitive to the costs that are brought in by all of the parties. Those costs determine the Shapley values themselves, and more directly, are “reimbursed” to the players when their Shapley shares of revenue are calculated (so that only revenue net of costs is actually shared). It therefore becomes very important to the model that only legitimate and reasonable costs are actually included.
- (88) As discussed below in detail, I begin with empirical evidence to estimate actual costs for services, record companies/artists, and music publishers/songwriters, at the aggregate industry level in the U.S., using 2019 data to avoid anomalies from the pandemic of 2020 (and 2021). The model that I have developed treats players of a given type (services, record companies, or music publishers) as equal among each other in terms of contribution to surplus, and I allocate their player industry costs among them equally. In other words, if I model three streaming service players, I allocate to each of them a third of the streaming industry costs. If I model four streaming services, I allocate to each of them a quarter of the streaming industry costs.
- (89) Given that the Shapley model does reimburse relevant costs, there exists the incentive for the different players to overstate their relevant costs in order to increase the payoff (expressed as a share of revenue) that is derived from the model. Therefore, if the model is to work correctly, we should take care to only include those costs of each of the players that relate to the generation of revenue for the business at hand.<sup>38</sup>

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<sup>38</sup> The problem of cost-inflation in situations in which cost recovery is present is not restricted to calculating Shapley values for interactive streaming. The U.S. Department of Defense has a similar issue with their cost-reimbursement contracts. Most contracts the U.S. Military engages in are fixed cost, but when they commission the development of new military technology the final cost is often unknown. Hence, the U.S. Military sometimes does cost-reimbursement contracts where the private military contractor tells the government how much they spent on development (per month) and the U.S. Government just reimburses that cost. Of course, this creates an incentive for



- (90) On this point, it is important to remember that the products being modelled here are the full catalogues of songs, which are made available through a joint venture of songwriters and music publishers. Songwriters create the songs with the support of music publishers, who incur further costs compiling and administering the songs and catalogues. The rights at issue are owned by songwriters and music publishers together, who have both incurred costs in connection with the creation and availability of the product. The costs on the supply side of this market thus involve the songwriters' costs and the music publishers' costs.<sup>39</sup>

### 1. Musical works costs

- (91) For the publishing industry, I have referred to testimony that I understand is being submitted concurrently with this report by three financial executives at the three largest music publishing companies. Their names are JW Beekman of Universal Music Publishing Group, Tom Kelly of Sony Music Publishing and Annette Yocum of Warner Chappell Music. Each of them provides a clear statement of U.S. revenues from their total business and specifically from the interactive streaming space. They also provide information on their companies' U.S. costs broken down into various categories. I use the information that they provide for 2019 because, although it is not the most current year, we of course suffered a global pandemic in 2020 which closed many offices and slowed many business activities, which could make costs data for 2020 anomalous.
- (92) I have included costs identified in their testimony that appear reasonably related to the actual costs of the imagined joint venture that the Shapley models. Thus, I include overhead costs, which may include such items as rent, employee costs, administration costs and equipment related

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the private military contractor to inflate costs and move costs from other fixed cost projects to the cost-reimbursement project. Therefore, the U.S. Military has developed a set of rules around which costs are "allowable" and which are not. The guidelines are contained in a publicly available website (sub-part 31 of the acquisitions rules; see Subpart 31.2 (<https://www.acquisition.gov/far/subpart-31.2>); and especially Subpart 31.201 (<https://www.acquisition.gov/far/31.201>) and Subpart 31.205 (<https://www.acquisition.gov/far/31.205>)). Applied to Shapley modelling, these guidelines imply that the players should only be reimbursed costs incurred that are essential for their respective roles in making music available through interactive streaming, and without which the total surplus of the industry would be smaller.

<sup>39</sup> Likewise, sound recording catalogues are the product of a joint venture between artists and record companies, both of whom contribute to the creation and availability of the product, and both of whom share in the ownership and/or royalty income.

to running the business. I also include “Artist and Repertoire” or A&R costs. As described by Ms. Yocum, the A&R department is “focused on discovering new songwriters and then working with them to help them develop their talents.”<sup>40</sup> This is of course central to the joint venture, which depends upon songs at its core. I do not include sales and marketing costs, as such costs do not seem sufficiently related to the joint venture. Further, music (and streaming music) are hardly unknown products that require consumer education. Marketing expenses in a developed and highly-visible market can be expected to be largely competitive, aimed at taking market share from competitors. In a Shapley analysis, moneys spent trying to take surplus from other players in the joint venture are not legitimate costs to be reimbursed. To do otherwise would be to promote and subsidize competition among joint venture players, which is to the net detriment of the venture itself, and effectively just shifts total surplus from the joint venture to advertising companies.<sup>41</sup>

- (93) Music publishers obtain revenues from sources other than interactive streaming, and therefore there is a choice to be made in modelling as to whether to include all costs or only a proportionate share of costs. In *Phonorecords III*, Prof. Marx included all U.S. music publisher costs in her model.<sup>42</sup> The argument for this is that music publishers work with effectively a single product—songs, and all of the costs relating to the cultivation of the songs themselves are necessary for the joint venture, since the venture itself simply would not exist but for the expenditure of those costs, regardless of what other revenue streams exist. While this assumption particularly applies to costs associated with A&R, advances and finance costs to support songwriters, and corporate overhead necessary to support A&R, it could also be generally applied to all music publisher costs, as was implicit in Prof. Marx’s model.

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<sup>40</sup> Written Direct Testimony of Annette Yocum, *Phonorecords IV*, 21-CRB-0001-PR (2023-2027) (“Yocum WDT”), at ¶ 20.

<sup>41</sup> This seems particularly problematic where the Services in this proceeding also own some of the largest advertising markets in the world. See House Report at 206-211.

<sup>42</sup> Written Direct Testimony of Leslie Marx, *Phonorecords III*, eCRB Docket No. 13950 (“Marx WDT”), at App’x B.1.

- (94) Another, more conservative, approach is to allocate only a portion of costs based on the percentage of their total revenues that relate to interactive streaming. Such allocation takes the assumption that costs should be viewed as divisible between multiple revenue streams. This is an appropriate assumption for costs that would be likely to decrease if certain of those revenue-generating activities decreased or ceased. Costs such as licensing personnel might be an example of this type of cost.
- (95) As my discussion below indicates, either one of these modelling choices leads to the conclusion that musical works rates should increase and Copyright Owners' proposed rates are more than reasonable for the Services. In my models below, I will show the base results using only the more conservative assumption of a proportionate share of music publisher costs, and provide a sensitivity analysis around that number in Appendix D.
- (96) For the songwriting industry, I begin with an estimate of costs by taking the actual interactive streaming royalties currently<sup>43</sup> received by songwriters, which is obtained from music publisher financials.<sup>44</sup> This estimate would imply that the average songwriter is just "breaking even" between the labour and costs they expend and the royalties they receive from their songwriting work. Estimating songwriter costs is of course impossible to calculate with empirical precision, so in Appendix D I undertake a sensitivity analysis to see the effect of changes in this assumption. This low end of this sensitivity analysis takes estimated costs down to one-half of such royalties, which would imply that the *average* songwriter makes a very large profit from the labour and expenses they expend as part of their songwriting work, an assumption that seems implausible in the current market.<sup>45</sup> The high end estimates costs as one-and-a-half times such current royalties,

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<sup>43</sup> For all of the estimated costs, I use data for 2019 simply to avoid anomalous data due to the effects of COVID-19 on business activities.

<sup>44</sup> As discussed below, I think this is conservative, as it seems quite plain that songwriters *on average* do not receive a full wage at current royalty rates. This is not to say that some songwriters do not earn a full wage. Some do, and some surely earn much more, but the product in this joint venture involves full catalogues, and so all of the costs must be included.

<sup>45</sup> On this subject in general, the testimony of several songwriters in this proceeding is instructive. See Written Direct Testimony of Steve Bogard, *Phonorecords IV*, 21-CRB-0001-PR (2023-2027); Written Direct Testimony of Jamie Floyd ("Floyd WDT"), *Phonorecords IV*, 21-CRB-0001-PR (2023-2027); Written Direct Testimony of Angela Hunte, *Phonorecords IV*, 21-CRB-0001-PR (2023-2027); Written Direct Testimony of Jimmy Yeaey, *Phonorecords*

which would imply that the *average* songwriter spends more in labour and expenses that they receive in royalties. As the results show, the outcome of the Shapley analysis is not particularly sensitive to this assumption, and even the low end of the range, which does not seem consistent with songwriter experiences, counsels for rates at or above the Copyright Owners' proposed rates.

- (97) Despite that the model is not particularly sensitive to ranges of this input that go even quite low, I think it is worth taking a moment to consider songwriter costs, because facts about the industry provide evidence that the costs are much higher than the range I have used.
- (98) In addition to the actual expenses of the songwriters (such as purchase of musical equipment, management, transportation, costs to record “demos,” etc.),<sup>46</sup> the Shapley analysis must consider the value of the labour expended by songwriters (just as salaries of employees at companies are company costs), which is arguably the single most vital cost of the joint venture.<sup>47</sup> For these costs, we can look at the songwriting industry as a labour force.
- (99) The average salary for songwriters multiplied by the number of songwriters would be a helpful data point to understand these costs. On the first part of this, the U.S. Bureau of Labor Statistics (BLS) provides information on pay for the occupational category “music directors and composers,” and identifies \$52,250 as the median pay.<sup>48</sup> While I am not aware of any reliable estimate of the total number of songwriters, Spotify stated in February 2021 that it has 8 million creators on its platform.<sup>49</sup> Note that this is simply a jaw dropping amount of labour, even if one

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*IV*, 21-CRB-0001-PR (2023-2027); Written Direct Testimony of Autumn Rowe (“Rowe WDT”), *Phonorecords IV*, 21-CRB-0001-PR (2023-2027).

<sup>46</sup> Some of these are mentioned in the testimony of songwriters Autumn Rowe and Jamie Floyd. See Rowe WDT, at ¶ 23; Floyd WDT, at ¶ 9.

<sup>47</sup> In the *Phonorecords III* proceeding, Prof. Marx undertook a Shapley that entirely omitted all songwriters' and artists' costs. This modelling error was explained by Prof. Gans although both Prof. Gans and myself focused on correcting the numerous other serious problems with Dr. Marx's model. See Written Rebuttal Testimony of Joshua Gans, *Phonorecords III*, eCRB Docket No. 12300 (“Gans WRT”), at ¶65. However, the complete omission of all songwriter and artist-related costs alone also had material effect on the results of her model. Including those costs would have raised her predicted combined royalty by more than 10%, and predicted a musical works royalty as a percentage of service revenue well in excess of her prediction and even the 15.1% rate set by the Board.

<sup>48</sup> See COEX-9.3 (U.S. Bureau of Labor Statistics, Occupational Outlook Handbook: Music Directors and Composers, <https://www.bls.gov/ooh/entertainment-and-sports/music-directors-and-composers.htm>).

<sup>49</sup> *Spotify Technology S.A. (SPOT) CEO Daniel Ek on Q2 2021 Results – Earnings Call Transcript*, Seeking Alpha (July 28, 2021), <https://seekingalpha.com/article/4442050-spotify-technology-s-spot-ceo-daniel-ek-on-q2-2021->

assumes that there a good deal of inflation and not all of these creators are at full capacity. Spotify is not a user-generated content platform like YouTube, where anyone can click and upload and be considered as “creator.” In order to distribute music on Spotify, one must work through a music distribution company that typically requires assignment of ISRCs (International Sound Recording Code) and UPCs (Universal Product Code) and other information.<sup>50</sup> Spotify also does not work on its Songwriter Pages with songwriters who do not work with publishing companies.<sup>51</sup> 8 million of such creators is again an astounding number. For perspective, Spotify employed 6,554 employees as of 2020.<sup>52</sup>

- (100) One does not have to assume that all, most or even a minority of the creators are full-time music professionals to conclude that the collective costs of creating the music catalogues that the Services make available are enormous. If all were such full-time professionals, that would equate \$418 billion in annual labour costs at the BLS median pay. Thus, if only *one percent* were full-time songwriters, and the rest did nothing at all, that would still be over \$4 billion in annual labour costs, far more than aggregate musical works royalties.
- (101) There is some further detail available on Spotify’s website, which provides data on the number of recording artists whose catalogues generate more than USD \$10,000 in combined sound recording and musical works royalties annually, which Spotify indicates was approximately 42,100.<sup>53</sup> \$10,000 is equivalent to millions of user streams, and so reflects work with substantial consumer attention. This figure measures recording artist catalogues, but each sound recording in the catalogue embodies a musical work. If the artist is not a solo singer/songwriter, there may be numerous songwriters delivering the musical work content for that catalogue. Yet assuming

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[results-earnings-call-transcript](#) (“[T]he platform we’re building is all about moving from 8 million to 50 million creators...”)

<sup>50</sup> COEX-9.4 (*Getting music on Spotify*, Spotify for Artists, <https://artists.spotify.com/help/article/getting-music-on-spotify>).

<sup>51</sup> COEX-9.5 (*Request a Songwriter Page*, Spotify Research, <https://spotifyresearch.typeform.com/to/oS0jfp> (after form choices for an independent songwriter: “We currently only support Songwriter Pages for writers who work with publishing companies.”)).

<sup>52</sup> *Spotify*, Wikipedia, <https://en.wikipedia.org/wiki/Spotify>.

<sup>53</sup> COEX-9.6 (*Loud&Clear by Spotify*, <https://loudandclear.byspotify.com/?question=spotify-pay-per-stream>).

only a single full-time songwriter for the entirety of each of these 42,100 catalogues estimates songwriter labour costs of \$2.2 billion, far above the range I use to estimate songwriter costs.

- (102) The growth of streaming catalogues further points to a tremendous amount of songwriting labour. Streaming catalogues are growing at the rate of about 60,000 new sound recordings each *day*.<sup>54</sup> While there are surely some “cover” recordings that do not involve new musical works, even a small percentage of this number points to very high creator costs. Again, I use cost numbers far below where these numbers point, and thus caution that my range may understate songwriter costs significantly.
- (103) Since songwriters also earn royalties from other products, and the evidence appears that songwriters on average do not obtain adequate wages factoring in all royalties, the same modelling choice presents itself as to whether to include all songwriter costs or only a proportionate share based on interactive streaming royalties. As Appendix D reflects, this choice does not affect the final conclusion supporting Copyright Owners’ proposed rates. In my models below, I only include in the base results a portion of songwriter costs based on the percentage of their total royalties that relate to interactive streaming.

## 2. Sound recording costs

- (104) For the record companies, I use the public filings of Warner Music Group (WMG), which provide a breakdown of costs incurred in connection with its record company business. This approach is similar to that used by Dr. Marx in her Shapley model in *Phonorecords III*, although rather than WMG market share estimates, I extrapolate these costs to the sound recording industry using the precise figures for total sound recording interactive streaming industry revenues (TCC) from the royalty reporting of the Services.<sup>55</sup>

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<sup>54</sup> COEX-9.7 (Tim Ingham, *Over 60,000 Tracks are now uploaded to Spotify every day*, Music Business Worldwide (Feb. 24, 2021), <https://www.musicbusinessworldwide.com/over-60000-tracks-are-now-uploaded-to-spotify-daily-thats-nearly-one-per-second/>).

<sup>55</sup> Prof. Marx arrived at her measure of costs by starting with selected worldwide costs as a percentage of worldwide revenues. She then applied this percentage to WMG’s total US music publishing revenues to arrive at US costs. She then trued this number up to the whole industry based upon an estimate of WMG’s market share. As noted above, Prof. Marx included the costs for WMG’s entire U.S. recorded music business. She did not allocate only a portion

- (105) For the artists’ costs, I use a similar estimate as to songwriters, namely that artists *on average* are not earning even full wages. The numbers referenced above in connection with songwriters apply equally here. Interactive streaming is fuelled by a simply staggering labour force, and in a willing buyer/willing seller situation, with symmetrical information and effective competition, where no party can holdout against the other, the costs of this labour would absolutely be factored in, as the entire joint venture disappears without the expenditure of these costs.
- (106) The same modelling choice arises for record companies and artists as to whether to use the full costs or an allocation based on revenue, and I follow the same path as described above with respect to music publishers and songwriters, reflecting the more conservative allocation in the base results below.

### 3. Streaming service costs

- (107) Because we are modelling the division of surplus between the services and copyright owners, and are thereby *outputting* the shares of those parties, we do not take them in as an input to the model. Thus, for the streaming services, we look only at their costs outside of music royalties, which has been termed non-content costs. To be clear, there is nothing about “content costs” versus “non-content costs” that should inherently be excluded from a Shapley model. The exclusion of Service content costs is simply because in this model, those represent the shares of other players in the game, which we want to output, not take as an input. If we were doing a Shapley model of how Spotify should divide surplus with its infrastructure and advertising partners like Google, we would include music content costs in the model as a cost and exclude the moneys Spotify pays Google for infrastructure and advertising.
- (108) I estimate the Services’ costs using actual financial data from Spotify. Spotify has a large market share and should be subject to less distortion from estimated allocations than the other streaming service entities with large market share (Apple, Amazon and Google), which are of astounding

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of those costs based upon the proportion of revenues associated with interactive streaming. She did, however, omit artist costs entirely.

size and diversification.<sup>56</sup> Using Spotify for costs is also a conservative choice, because there can be no question that the streaming costs of Apple, Google and Amazon—who together make up the majority of the interactive streaming market—will be *lower* than Spotify’s. Economies of scale and scope are among the most reliable rubrics in all of industry, and these three Services have perhaps the largest such economies in all of the world. As I noted in the Report in *Phonorecords III*, [REDACTED]

- (109) On this point, it is worth taking time to consider the remarkable situation of the interactive streaming market having these particular three companies all competing within it and comprising the majority of the market. The House Report details the advantages of each of these companies with respect to economies of scale and scope, and they surely apply with respect to streaming costs as well.<sup>58</sup> As a particularly glaring example, Google hosts Spotify’s infrastructure platform, and Spotify’s costs involve hundreds of millions of dollars paid to Google for this cloud infrastructure.<sup>59</sup> Prior to Google, Spotify had used Amazon for cloud services.<sup>60</sup> Amazon runs the largest cloud services business in the world, including that of the Board itself. The Library of Congress is expanding the infrastructure for the entire U.S. legislative branch to be hosted by Amazon, Google and Microsoft.<sup>61</sup>

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<sup>56</sup> Spotify has also diversified into other product areas, particularly podcasts, and therefore will also have allocation issues, but should have fewer relative to the large technology companies (as would nearly any company in the world).

<sup>57</sup> Written Rebuttal Testimony of Richard Watt, *Phonorecords III*, eCRB Docket No. 12300 (“Watt WRT”), at ¶ 33, n.21.

<sup>58</sup> House Report at 45-48, 87, 115, 124, 177, 182, 319, 342.

<sup>59</sup> COEX-9.8 (Guillaume Leygues, *Spotify chooses Google Cloud Platform to power data infrastructure*, Google Cloud Blog (Feb. 23, 2016), <https://cloud.google.com/blog/products/gcp/spotify-chooses-google-cloud-platform-to-power-data-infrastructure>); COEX-9.9 (Jordan Novet, *Spotify will spend nearly \$450 million on Google’s cloud over 3 years*, CNBC (Mar. 20, 2018), <https://www.cnbc.com/2018/03/20/spotify-will-spend-nearly-450-million-on-google-cloud-over-3-years.html>).

<sup>60</sup> COEX-9.10 (Nick Heath, *Switching clouds: What Spotify learned when it swapped AWS for Google’s cloud*, TechRepublic (Oct. 21, 2016), <https://www.techrepublic.com/article/switching-clouds-what-spotify-learned-when-it-swapped-aws-for-googles-cloud/>).

<sup>61</sup> See Billy Mitchell, *Library of Congress plots \$150M multi-cloud acquisition for legislative branch*, FedScoop (May 4, 2020), <https://www.fedscoop.com/library-of-congress-cloud-legislative-branch/>).



- (110) Spotify also uses Google’s Ad Manager services for its advertising business,<sup>62</sup> and used Google Sales Manager advertising product until 2019, when it suffered millions in losses switching away from that product.<sup>63</sup> Spotify has been embroiled in a substantial dispute with Apple over the fees that Apple charges Spotify in connection with sales of Spotify subscriptions through iPhones, filing an antitrust suit in Europe and claiming that Apple has “an unfair advantage” by virtue of its lower costs, as it takes a commission of 30 percent of the revenues from sales through its App Store platform.<sup>64</sup> Spotify recently testified before the U.S. Senate in connection with its inquiry into Apple and Google’s unfair competition by virtue of their app stores, arguing that Apple directly competed with Spotify with Apple Music, and Apple’s in-app charges had made Spotify less competitive, and that Apple was undercutting Spotify on price.<sup>65</sup>
- (111) In short, there can be no reasonable conclusion except that Spotify’s non-content costs are higher than those of Apple, Google or Amazon, and extrapolating Spotify’s costs to a market that is comprised primarily of Apple, Google and Amazon represents the high end of a range of costs for streaming services.
- (112) To calculate this number, I take Spotify’s U.S. costs, as produced in this proceeding, and extrapolate them to the full market based upon Spotify’s share of overall industry revenues. I

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<sup>62</sup> COEX-9.11 (*Spotify expands its Programmatic Guaranteed offering with audio ads*, Google Ad Manager Case Study, <https://admanager.google.com/home/resources/spotify-expands-programmatic-guaranteed-with-audio/>).

<sup>63</sup> COEX-9.12 (Alison Weissbrot, *Spotify Loses \$10 Million in Revenue from Switching Off Google Sales Manager*, Ad Exchanger (Oct. 28, 2019), <https://www.adexchanger.com/digital-audio-radio/spotify-loses-10-million-in-revenue-from-switching-off-google-ad-manager/>).

<sup>64</sup> COEX-9.13 (Adam Satariano & Jack Nicas, *Spotify Accuses Apple of Anticompetitive Practices in Europe*, N.Y. Times (Mar. 13, 2019), <https://www.nytimes.com/2019/03/13/business/spotify-apple-complaint.html>). Where Apple takes a 30 percent commission on sales of Spotify through its phone, Apple will make more *direct* profit from sales of Spotify subscriptions than it does from sales of its own Apple Music subscriptions (for which it has associated costs). Of course, Apple does not promote Spotify’s product over its own, in part because it makes much more *overall* profit from Apple Music subscriptions, since those also bring Apple much larger revenues in its other, much larger product lines.

<sup>65</sup> COEX-9.14 (James Clayton, *Google and Apple attacked on app store ‘monopoly’*, BBC News (Apr. 22, 2021), <https://www.bbc.com/news/technology-56840379>). The irony of Spotify complaining of abusive market power because Apple takes a 30 percent commission for doing nothing but develop and run a platform that distributes its app - while arguing that it is fair for Spotify to take a 30 percent commission for doing nothing but develop and run a platform that distributes others’ music content - is apparently as evident to others as it is to me. See COEX-9.15 (April Glaser, *Why Spotify Is Such an Awkward—and Necessary—Critic of Apple’s Power*, Slate (Mar. 13, 2019), <https://slate.com/technology/2019/03/spotify-apple-monopoly-antitrust-artists-streaming-app-store.html>).

include Spotify's costs associated with streaming (including the moneys that it pays to Google), as well as its general and administrative (G&A) costs. I also include Spotify's Research & Development (R&D) costs, although it appears clear from Spotify's public statements that it is heavily focused on developing its podcast business, which generates revenues that it does not share with music copyright owners. Costs developing a separate product that is not part of the joint venture should not be included in the Shapley, and so my assumptions are conservatively high costs for Spotify, assuming that much of its R&D costs relate to podcasts. As with music publishers and record companies, I do not include sales and marketing expenses, as competitive advertising is a drain on the joint venture and not an appropriate Shapley cost. On this, I particularly note that the U.S. streaming market has become quite saturated, and knowledgeable observers have noted that competition is particularly focused on taking market share from other competitors rather than increasing the market.<sup>66</sup> Spotify's executives have even openly admitted that Spotify spends more on advertising than it needs to, in pursuit of growth, and particularly growth outside of music, which is a separate revenue stream.<sup>67</sup> While there could be some acceptable costs for marketing the joint venture that is aimed at new users, the inability to identify those reasonably, and the likelihood that they are low in comparison to competitive advertising, makes a modelling decision to omit marketing costs for all entities—services, record companies

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<sup>66</sup> COEX-9.16 (Amy X. Wang, *Why Do We Still Pay Only \$10 a Month for Music?*, Rolling Stone (Dec. 11, 2019) (<https://www.rollingstone.com/pro/news/music-streaming-10-month-fee-924809/>); Mark Mulligan, *"Hi-Res audio: It's all about a maturing market,"* MIDia (May 21, 2021) <https://www.midiaresearch.com/blog/hi-res-audio-its-all-about-a-maturing-market> (discussing streaming market commodification and saturation).

<sup>67</sup> COEX-9.17 (Spotify Technology S.A. (SPOT) Q4 2020 Earnings Call Transcript, Motley Fool, <https://www.fool.com/earnings/call-transcripts/2021/02/03/spotify-technology-sa-spot-q4-2020-earnings-call-t/>) (Daniel Ek, CEO, in response to a question about margin growth: "We are very much still in the investment phase of Spotify. And it's not just the investment phase in music that we're pursuing because clearly there we could show a lot more operating margin improvements as well by, for instance, of lowering the sales and marketing costs and some of those things that Paul mentioned. But we're going after billions of consumers around the world and we're going broadly after the category called audio."). Spotify also discussed on this call that its G&A costs remained high because of its launching in "more and more markets." *Id.* While I have included all of Spotify's G&A costs allocated to the U.S., this appears to indicate that such an allocation overstates the U.S. costs, as the costs are disproportionately incurred in markets outside of the U.S.

and music publishers—more appropriate.<sup>68</sup> Nonetheless, to provide transparency on how the input affects the model, I include marketing costs in my sensitivity analysis in Appendix D.

## VIII. Understanding marginal contribution to revenue in partial cohorts

- (113) As discussed above, I believe that modelling the sound recording catalogues as *strict* “must haves” is less reflective of the market than modelling them as *relative* “must haves,” where the absence of a catalogue from all streaming services lowers, but does not preclude, revenues. The Shapley model, by its nature, prevents hold-outs and requires each player’s input to be available to each other player within a given cohort, but we still need to build into the model the incremental revenue obtained by the partial cohorts as players are added. In other words, we need to assign a total cohort value for the revenue that is earned by each and every cohort within each and every arrival ordering.
- (114) Since some of the models below have as many as 9 players, there are up to 362,880 different arrival orderings, and each arrival ordering contains 9 different cohorts (each individual player is added sequentially to the set of players that have already arrived), there are  $362,880 \times 9$  (i.e. more than 3 million) different cohorts to deal with (although many of these cohorts will be common across the different arrival orderings).
- (115) Still, we can do quite a good job modelling this out, and most importantly, understanding what the effects are of this more nuanced understanding of the “must have” nature in interactive streaming. I lay out the full details and the mathematical functions involved in Appendix C.
- (116) The model operates exactly in the accepted and standard way all Shapley models work. Take the construction of a particular arrive ordering (out of the huge number of possible arrival orderings). The first player to “arrive” in the cohort or coalition, generates no revenue (since to generate revenue the situation requires at least one of each player type) and imposes no costs (since there

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<sup>68</sup> Furthermore, any understatement of such costs with respect to the Services is surely more than offset by the overstatement of costs spent on other products, as well as the general overstatement of industry costs given that the majority of the industry involves players with lower cost profiles than Spotify.

is no business operating). Players are then added sequentially in a particular order (the order corresponding to this particular arrival ordering), and as soon as there are sufficient players in the cohort for some revenue to be generated, the business opens, revenue is earned, and existing players all incur costs. As more players join the cohort, right up until all have joined (the grand cohort is achieved), revenues and the costs of the players add up. The value, or surplus, of any given cohort is the value of that cohort's revenue less the value of total cohort costs. The marginal value of each player in the cohort is the value of the cohort after the player has joined, less the cohort value before the player has joined. Thus, for each arrival ordering, there is a "marginal value" for each and every player. Finally, each player's "Shapley value" is the average of their marginal values over all possible arrival orderings.

(117) In order to understand the different models that I now go on to present, the following notation is observed throughout (again, full details are set forth in Appendix C):

- a. There are  $\hat{S}$  services,  $\hat{L}$  record companies, and  $\hat{P}$  music publishing firms in the grand cohort of all players in a model. The amount of revenue earned by the grand cohort is denoted by  $\hat{R}$ .
- b. In any given partial cohort, the numbers of services, record companies and publishers are (respectively)  $S$ ,  $L$  and  $P$ . The amount of cohort revenue is  $R$ .
- c. Parallel or displaced income (earned by, and retained by, the services alone, so not shared with the other players) is denoted as a fraction of total cohort revenue, that is, parallel net revenue of a cohort is denoted by  $qR$ . Parallel income is calculated as net revenue (i.e. revenue less costs) that is earned but not shared by the services. Therefore, the parameter  $q$  captures both the amount of parallel income and the costs faced by the services in receiving this revenue.<sup>69</sup>

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<sup>69</sup> For example, say a service earns, in parallel with regular streaming revenue of  $R$ , a further amount of revenue that is equal to 80% of  $R$  (that is, parallel gross revenue is  $0.8R$ ), but which costs 30 cents per dollar to earn. In that case, parallel net revenue (or parallel income) is  $(0.8 - 0.3)R = 0.5R$ , so we would have  $q = 0.5$  in this case.

- d. Industry costs of the services, when all  $\hat{S}$  services are present in a cohort, is denoted by  $\hat{T}$ . Likewise, the industry costs of the record companies (when all are present) is  $\hat{W}$ , and the industry costs of the music publishers (again, when all are present) is  $\hat{Y}$ . For partial cohorts, these costs are represented by (respectively)  $T$ ,  $W$  and  $Y$ .
- e. The parameters  $\alpha$  and  $\beta$  capture the degree to which (respectively) record companies and services are substitutable for one another. These two parameters admit values between (and including) 0 and 1. Setting  $\alpha = 0$  establishes a model in which record companies are perfect substitutes for each other, and setting  $\alpha = 1$  makes record companies perfectly non-substitutable.<sup>70</sup> The same settings for  $\beta$  makes services either perfectly substitutable, or perfectly non-substitutable. Intermediate values of these parameters establish models of imperfect substitutability, which correspond also with an assumption of diminishing returns to the addition of players of a given type.
- f. The parameter  $k$  identifies the assumption made on the “must have” nature of record company catalogues. If  $k$  is set equal to 0, then the model operates assuming *relative* must haves (i.e. positive revenue can be obtained by a cohort even without all  $\hat{L}$  record companies present), while setting  $k$  equal to 1 gives a model in which the assumption is that record company catalogues are *strict* must haves (so positive revenue is only possible if all  $\hat{L}$  record companies are present in a cohort). As stated above, the appropriate model for the actual market is  $k = 0$ , though I include scenarios with  $k = 1$  for comparison purposes. I also specifically discuss below the impact of changes in this parameter.

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<sup>70</sup> As is set down in Appendix C, the substitutability parameter for record companies also applies to publishers in a model in which there is more than 1 publisher. The concrete meaning of “substitutability” is also spelled out in Appendix C.

## IX. Understanding the impact of different variables on the results delivered by the model

- (118) In this section, I provide a first overview of the Shapley model, employing a simple but illustrative example. The rationale behind this is to clearly show the effects of the different parameter choices upon the final outcome of the model. By using an example, with hypothetical input values, I am easily able to alter those input values to anything that I would like in order to show how each particular parameter affects the results. This simple sensitivity exercise will inform the Judges of the relative importance of each of the parameter values in determining a fair and effectively competitive rate for the mechanical license. The examples are based upon a “baseline” scenario, which is then altered according which input parameter that I wish to focus attention upon.
- (119) It is important to understand that the examples and tables in this section are only meant as an illustrative example. (In Appendix D, I provide a sensitivity analysis around the actual inputs used in the model.) What is important is not the actual numbers used, but rather the changes in the sizes of the sharing rule numbers, relative to the changes in the sizes of the input parameter values. Those relative effects are fundamental for understanding the importance of using appropriate parameter values when we input the data that is actually relevant for the real-world.
- (120) Take the following parameter values as the baseline model for this example:

$$\begin{aligned}\hat{L} &= 3, \hat{S} = 3, \hat{P} = 3, \alpha = 0.9, \beta = 0.1, \\ \hat{R} &= \$1,000, \hat{T} = \$100, \hat{W} = \$200, \hat{Y} = \$50\end{aligned}$$

- (121) The following examples show that the two variables that make the most difference are the assumption on the must-have nature of labels,  $k$ , and the amount of parallel income of the services,  $q$ .
- (122) Start by assuming, along with the above parameter values, that  $q = k = 0$ . With those numbers, the baseline model generates the following revenue shares (expressed as percentages of the total

grand cohort revenue,  $\hat{R}$ ): music publishers<sup>71</sup> (in total), 32.8%; record companies (in total), 47.8%; services (in total), 19.4%.

#### A. Understanding the effects of changes in substitutability on the sharing rule

- (123) Now, repeat the example (still with  $q = k = 0$ ) with, say,  $\alpha = \beta = 0.5$ . We get the following revenue shares: Publishers (in total), 26.7%; record companies (in total), 41.7%, services (in total), 31.7%. We can see that decreasing  $\alpha$  and increasing  $\beta$  (and setting the diminishing returns parameters for record companies and services to be equal) has the effect of increasing the revenue share of the services by 12.3 percentage points, since increasing  $\beta$  makes services less substitutable and thus more essential, and spreading that percentage change over the record companies and the publishers by reducing their shares by about 6.1 percentage points each, since the decrease in  $\alpha$  makes musical catalogue more substitutable and thus less essential. Relatively important re-alignments of revenue shares are obtained, but then, the assumed change in parameters is relatively large in size.<sup>72</sup>

#### B. Understanding the effects of changes in displaced revenue on the sharing rule

- (124) Now, consider the effects of displaced revenues on the baseline model outcomes. Some examples (using as the rest of the parameter values those set out above as the baseline case) are:

All revenue shares are percentages of shareable revenue,  $\hat{R}$ :

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<sup>71</sup> Simply for ease of notation, I sometimes use “music publishers” or “publishers” as shorthand for the group of musical works rightsholders, including songwriters and music publishers, whose rights would typically be represented by music publishers in bargaining. I likewise sometimes use “record companies” or “labels” as shorthand for the group of sound recording rightsholders, including artists and record companies, whose rights would typically be represented by record companies in bargaining.

<sup>72</sup> Moving from 0.1 to 0.5 is an increase of 400%. Moving from 0.9 to 0.5 is a decrease of almost 45%.

**Table 1****Shapley revenue sharing rule for baseline example with different displaced net revenue**

$q$	Revenue share for musical works	Revenue share for sound recordings	Revenue share for services
0 (no displaced revenue)	32.8	47.8	19.4
.1 (displaced net revenue = 10% of declared revenues)	37.1	52.1	10.8
.2 (displaced net revenue = 20% of declared revenues)	41.4	56.4	2.2
.3 (displaced net revenue = 30% of declared revenues)	45.6	60.7	-6.3

- (125) We see that each increase successive in  $q$  of 0.1 takes somewhat more than 8 percentage points from the revenue share of the services, and shares that out evenly between the publishers and the labels. Notice that with a level of parallel income that is only 30% of total streaming revenue (i.e.  $q = 0.3$ ), the labels end up with slightly more than 60% of revenues and the services end up with a negative share of *streaming product* revenue (but nonetheless significant income due to streaming due to its displaced revenue). This is a case in which the services earn enough in parallel income that they are willing to use streaming as a loss leader in order to obtain that parallel income, something that is in fact being done in the market now.

### C. Understanding the effects of changes in costs on the sharing rule

- (126) Now, let us go back to original values for  $\alpha$  and  $\beta$ , and add costs of \$50 to each of the players in turn. Notice that this is a significant change, doubling the costs of publishers if it is added to their costs, increasing the costs of the services by 50%, or increasing the costs of the record companies by 25%. Doing this gives the revenue shares that are shown in the following table:



**Table 2**  
**Shapley revenue sharing rule for baseline example with different costs**

	Publishers' rev. share	Labels' rev. share	Services' rev. share
Before any added costs	32.8	47.8	19.4
\$50 increase in publisher costs	35.7	45.7	18.6
\$50 increase in label costs	30.7	50.7	18.6
\$50 increase in service costs	30.7	45.7	23.6

- (127) We see that, the player whose costs increase gets exactly an increase in their revenue share of 5 percentage points relative to when they are not the one with the revenue increase. And, the two players whose costs are not increased, get the same share of revenue independently of who the player with increased costs is (so, yellow cells for publisher, green cells for labels, and blue cells for services).
- (128) In short, a (relatively) large change in costs generates a (relatively) small, but nevertheless significant, change in the sharing rule.

D. Understanding the effects of changes in the must have assumption on the sharing rule

- (129) Finally, all of the above examples are carried out under the assumption  $k = 0$ , that is, the musical catalogues of the record companies are relative must haves. I now repeat the baseline example, but under the assumption  $k = 1$ , i.e. the record companies are absolute must haves. Doing this gives the revenue shares that are shown in the following table:

**Table 3**  
**Shapley revenue sharing rule for baseline example  
with different music must-have assumption**

	Publishers' rev. share	Labels' rev. share	Services' rev. share
$k = 0$	32.8	47.8	19.4
$k = 1$	36.5	51.6	11.9

- (130) Changing the must have assumption on musical catalogue has the effect in this example of increasing the revenue shares of both types of copyright holders at the expense of the services compared to when  $k = 0$ . This is because the switch from  $k = 0$  to  $k = 1$  increases artificially the necessity of musical catalogue relative to the necessity of the services, and so it benefits (artificially) the copyright holders relative to the services. However, as I have argued elsewhere in this report, the understanding of the must-have nature of musical catalogue that is embodied in the assumption  $k = 1$  is distortionary in terms of representing effective competition, and therefore not appropriate. I advocate for using instead  $k = 0$ , in order that the Shapley model delivers revenue sharing rates that are fair and effectively competitive.

## X. Appropriate Shapley model inputs

- (131) I now want to use the Shapley model just described and outlined to calculate the share of interactive streaming revenue that should be allocated to the musical works copyright supplier (publisher), given the current real-world scenario, as well as that share relative to record companies and streaming services. To do that, all I need to do is to populate the model with parameter values that correspond, to the best of my knowledge, to the current real-world situation. I have done that with my preferred parameter values, which I refer to here as the “baseline” model, but as a robustness check, I set out the Shapley model results using a range of alternative parameter choices, for purposes of comparison with the baseline specifications, both below and in Appendix D.
- (132) For the reasons outlined above, I prefer to set  $k = 0$  in the baseline model, so that the labels are only “must haves” when they are part of a cohort within the Shapley calculations. Thus, in any cohort, all available services obtain a license from all available labels, and no service obtains a license to the catalogue of any label that is not in the cohort. I believe that this is the appropriate representation of the reality of the interactive music streaming industry.
- (133) Second, the services each offer essentially the same product to subscribers – a full catalogue of available music, on demand, and at essentially the same price. It is therefore logical that the services are assumed to be highly substitutable among themselves. For that reason, in the baseline model I choose to set  $\beta = 0.1$ . In essence, this assumption implies that if a service were to close

down, then the large majority of its subscribers would migrate to one of the remaining services, and only very few would leave interactive streaming.<sup>73</sup> On the other hand, the record companies do each supply very different and unique catalogues of music. It is therefore logical to consider that those catalogues are highly non-substitutable among themselves, and for that reason I choose to set  $\alpha = 0.9$  in the baseline model. This implies that the loss of any one record company's catalogue will cause a significant loss of streaming subscribers. In any case, I will show in my sensitivity analysis results in Appendix D the effect of changing those substitutability assumptions within a range of my preferred estimates.

- (134) The fourth element to discuss is the amount of costs of the different participants in the model. Recall that the only costs that should be taken into account are only those that are actually required in order for each supplier to actually produce and supply the inputs to the final product. I lay out the calculation of the costs for the model in Appendix C below.
- (135) In short, the costs, and total streaming revenue, that I have used in the baseline model are the following:

Total interactive streaming revenue of the grand cohort:  $\hat{R} = 7,455,551,211$

**Table 4**  
**Industry costs of the different player types in the baseline Shapley model**

	Publishers	Record Companies	Services
Industry 2019 costs			

- (136) Next, there is the income that is earned by the services in parallel to interactive streaming that relies upon interactive streaming, but that is not shared with the other participants in the market (i.e. with the labels and with the publishers). It has been accepted by the Judges that this income

<sup>73</sup> In my rebuttal testimony in *Phonorecords III*, I had a similar assumption, although it was based upon a different measure of substitutability (the variable was denoted  $z$ , which could take a value between 0 and 3, where 3 indicated perfect substitutability. I used the value  $z = 2.9$ ). See Watt WRT at ¶ 32.

does indeed exist, but actually measuring it has not been possible. Here in the baseline model, I will set out a range of possible values for this income, in order to simply show the effect that it has upon the Shapley sharing rule.

- (137) Finally, there is the choice of how many of each player type (music publishers, record companies, services) to include in the model. Here I will use four different model specifications in this regard, using within each of them the baseline parameter values. The four models contain different assumptions on how many players there are, and how many of each type.

## XI. The results of Shapley analysis across a wide range of modelling choices and variables recommend a substantial increase in the musical works royalty rate

- (138) The following results are directly calculated from my Shapley model. In all cases, the results show the fractions of the revenue of the grand cohort (i.e. a market in which all players are present), including the estimation of parallel service income where that is included, that is to be retained by each of the overall set of different player types. So, if the model has, say, four streaming services, then the reported output is the fraction of revenue to be retained by that entire set of four players, rather than the revenue to be retained by each individual streaming service.
- (139) In model specifications that have only 1 of any particular player type, then the relevant superindex indicating substitutability ( $\alpha$  or  $\beta$ ) becomes irrelevant for that player type. That is, if the model has only one recording company (i.e. the sound recording copyright holders are joined together as a single representative bargaining unit), then the parameter  $\alpha$  becomes irrelevant. It is impossible to have substitutability over label catalogues when there is only one player supplying label catalogue. In such a case, the model will output the same results independently of the actual substitutability parameter that is used.

### A. 3 Publishers, 3 Labels, 3 Services

- (140) The first market configuration to test is what I believe is the most appropriate configuration to model the streaming market, containing balanced groupings of players. Retaining the substitutability assumptions of  $\alpha = 0.9$  and  $\beta = 0.1$ , and the data above on costs and grand cohort

revenue, I assume here that there are an equal number of all three player types – so 3 music publishers, 3 record companies, and 3 services. The Shapley revenue sharing percentages, again for both assumptions on the must-have nature of labels, is the following:<sup>74</sup>

**Table 5**  
**Shapley revenue sharing percentages with**  
**3 services, 3 record companies and 3 publishers**

	$k = 0$			$k = 1$		
	Publishers	Labels	Services	Publishers	Labels	Services
$q = 0$	33.0%	44.8%	22.2%	36.0%	47.7%	16.3%
$q = 0.1$	37.3%	49.1%	13.6%	40.8%	52.6%	6.6%
$q = 0.2$	41.6%	53.3%	5.1%	45.7%	57.4%	-3.1%
$q = 0.3$	45.9%	57.6%	-3.5%	50.5%	62.3%	-12.8%

- (141) There are a few interesting and insightful ideas that come from this second table. First, in every single option regarding either the parameter  $q$  or the parameter  $k$ , the Shapley payment to music publishers significantly outstrips the status quo, clearly pointing to the fact that, even before any adjustment for unpaid risk-premiums, the current statutory rate for musical works is clearly insufficient to reward the contribution of musical works to the interactive streaming industry. Second, the (in my view incorrect) must-have assumption on labels inflates the music publishers' payoff somewhat in the same way that it does so for the labels. This is because with multiple publishers, they are much more intimately related to specific musical catalogues, and they become more “similar” to labels. Third, consider the outcome under the assumptions  $q = 0 = k$ . There, we see that the Shapley model delivers a payoff to publishers of 33.0% of revenue, and to labels of 44.8%. The ratio of sound recording royalties to musical works royalties here is 1.36:1 (and

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<sup>74</sup> The share percentages are rounded to one significant digit.

even closer when factoring in displaced revenues). This is a much closer ratio than even the improved ratio of 2.5:1 that was identified by the Judges in *Phonorecords III*. The lower ratios in this table would provide an appropriate method for adjusting royalty rates from sound recording agreement benchmarks for use in setting musical works rates in this proceeding, that is consistent with the willing buyer/willing seller standard and effective competition.

#### B. 1 Publisher, 1 Label, 4 Services

- (142) I now consider two market configurations with a single record company and a single publisher. These two configurations are similar in nature to those which were put forward in *Phonorecords III*, where several of the experts' Shapley models aggregated together the entire set of record companies into a single player, and likewise the publishers. Thus, with these two configurations, we can see exactly how the appropriate Shapley payoffs compare to those put forward in the *Phonorecords III* proceeding.
- (143) First, I study a configuration with 4 streaming companies, 1 record company and 1 publishing company. Notice that when there is a single record company (label), the choice of must-have status becomes irrelevant. Regardless of which assumption is made, there is no revenue unless the single label is present in the cohort. Also, the substitutability parameter for record companies is irrelevant in this setting, since with a single label, there is no ability for substitution.

**Table 6**  
**Shapley revenue sharing percentages with**  
**4 services, 1 record company and 1 publisher**

	$k = 0$ and $k = 1$		
	Publisher	Label	Services
$q = 0$	34.0%	45.8%	20.2%
$q = 0.1$	38.5%	50.3%	11.2%
$q = 0.2$	43.0%	54.7%	2.3%
$q = 0.3$	47.5%	59.2%	-6.7%

- (144) The smallest outcome for the publisher in this configuration is when one ignores the parallel income of the services, and even then, the revenue share of the music publisher should more than double from the status quo. The ratio of sound recording royalties to musical works royalties here ranges from 1.25:1 to 1.35:1.

#### C. 1 Publisher, 1 Label, 1 Service

- (145) The simplest market configuration is with a single publisher, a single record company, and a single streaming service. In this configuration, again there is no distinction between  $k = 0$  and  $k = 1$ . This time, it is also irrelevant which values for the two substitutability parameters we use, since with a single label and a single service, there is no ability for substitution anyway.



**Table 7**  
**Shapley revenue sharing percentages with**  
**1 service, 1 record company and 1 publisher**

	$k = 0$ and $k = 1$		
	Publisher	Label	Service
$q = 0$	28.2%	40.0%	31.8%
$q = 0.1$	31.6%	43.3%	25.1%
$q = 0.2$	34.9%	46.6%	18.5%
$q = 0.3$	38.2%	50.0%	11.8%

(146) While this configuration vastly overstates the importance of the services, which are in reality highly substitutable, the configuration at least is again balanced in terms of the number of players of each type. As for the previous configurations, the Shapley payoffs for music publishers are significantly above the status quo, clearly indicating that the status quo constitutes an unfair reward for musical works, or what is the same, the status quo represents a market that does not conform with effective competition. The ratio of sound recording royalties to musical works royalties here ranges from 1.31:1 to 1.42:1

#### D. 1 Publisher, 4 Labels, 4 Services

(147) In this final model specification, which is the one that I consider to be less appropriate than the others, there are four different recording companies, four different streaming services, and one representative publishing company. Using the same cost and revenue data reported above, the Shapley revenue sharing rules for the two cases of assumption on the “must have” nature of record company catalogues, and (in each of those cases) for the same range of relevant values of parallel income, are presented in the following table.



**Table 8****Shapley revenue sharing percentages with 4 services, 4 record companies and 1 publisher**

	$k = 0$			$k = 1$		
	Publisher	Labels	Services	Publisher	Labels	Services
$q = 0$	34.8%	44.8%	20.4%	21.1%	62.6%	16.3%
$q = 0.1$	39.4%	49.0%	11.6%	23.1%	70.3%	6.6%
$q = 0.2$	44.1%	53.2%	2.7%	25.0%	78.1%	-3.1%
$q = 0.3$	48.7%	57.5%	-6.2%	27.0%	85.8%	-12.8%

- (148) This scenario is where we can really see the effect of the strict “must have” modelling, as we model a significantly different number of labels and publishers. When we employ the reasonable and realistic assumption on the must have nature of labels ( $k = 0$ ), we see results consistent with the other models. There are more labels, but there are also partial cohorts among those labels that generate revenues, and so each label is not an absolute must have. The ratio of sound recording royalties to musical works royalties here ranges from 1.18:1 to 1.29:1
- (149) However, when we set up strict “must have” modelling, we see the label rate rise substantially over the other models. This rise comes at the expense of the services, but even more so at the expense of the music publishers. This is because no revenue is generated until the last label enters the coalition, and the more labels there are, the higher the odds that (between them all) they occupy that position in the ordering. This configuration is a poor representation of the relative market position of the music publishers vis-à-vis the record companies. As has been discussed above, the reality of this market is that each record label’s catalogue is controlled by many different publishers, the lack of any one of which would create substantial disruption to the repertoire available for a streaming service. The dual assumptions of several labels and one publisher create an unrealistic divide between label and publisher musical catalogues.

- (150) As there is only one publisher modelled, even though the one publisher is strictly necessary, it has only one “chance” at the last spot to complete the profitable cohort for every four chances that the four labels collectively have. This is what leads to the higher ratio of sound recording royalties to musical works royalties, which range from 2.97:1 to 3.18:1. The fact that the model must be warped with such difficult assumptions simply to reach a 3:1 ratio, which is still much closer than the ratio implemented in *Phonorecords III*, further indicates that rates should increase – although they should increase to a ratio closer to the preferred model.
- (151) In short, the best and most representative configurations are those in which there is a balance between the number of labels and the number of publishers, and in which there are multiple services. Those assumptions best capture the essential features of the streaming market, namely that both labels and publishers provide the truly essential input, and that the streaming services are highly substitutable among themselves. This is captured in my 3,3,3 model above, which counsels for a significant rise in the musical work royalty rate directly, and also provides a ratio for adjusting sound recording benchmarks to derive musical works royalties under the willing buyer/willing seller rate standard.

E. A final look at the immense effects of the actual parallel revenue at issue in the streaming market

- (152) I have reviewed the expert report of Robin Flynn on behalf of the Copyright Owners and am compelled to reference an empirical analysis that she undertakes based on internal documents obtained from Amazon concerning the extent of displaced revenues.<sup>75</sup>
- (153) Ms. Flynn utilizes [REDACTED]  
[REDACTED]  
[REDACTED]. She extrapolates that internal analysis to the 2019 market, estimating conservatively that, in connection with *only some* of Amazon’s complementary

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<sup>75</sup> Written Direct Testimony of Robin Flynn (“Flynn WDT”), *Phonorecords IV*, 21-CRB-0001-PR (2023-2027), at Section V.B.iii.

products (for example, *not* taking into account effects on Amazon’s Echo speaker line), Amazon saw [REDACTED].

- (154) Dr. Eisenach provides that Amazon’s total declared revenues for royalty sharing in 2019 were [REDACTED]. (Eisenach WDT, Appendix C, ¶ 1, fn.1). From this, we can estimate a *lower bound* for  $q$  for Amazon of .36, and an indication that  $q$  is in fact likely much higher.
- (155) If we rerun our preferred baseline model from Table 5 above, using  $q = .36$ , we get:

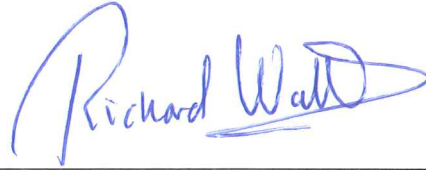
**Table 9**  
**Shapley revenue sharing percentages with**  
**3 services, 3 record companies and 3 publishers**  
**and lower bound for displaced revenues from internal Amazon analysis**

	$k = 0$			$k = 1$		
	Publishers	Labels	Services	Publishers	Labels	Services
$q = 0.36$	57.2%	58.4%	-15.63%	64.7%	65.9%	-30.69%

- (156) Here, we get a peek behind the information asymmetry that drives the fortunes of these giant companies. Again, this is likely a significant undercounting of displaced revenues, and it reveals that under a willing buyer/willing seller sharing rule that models an effectively competitive market where there is no asymmetry in information, Amazon would receive none of the direct music product revenues (which are under-priced and heavily discounted to act as a loss leader), but instead would share with copyright owners a portion of the great profits that it collects from the compulsory licensed music through its other product lines, and which help fuel the expected future profits that underlie its multi-trillion dollar valuation.

I, Richard Watt, declare under penalty of perjury under the laws of the United States of America that the statements contained herein are true and correct to the best of my knowledge, information and belief.

Executed on October 13, 2021 in Christchurch, New Zealand.

A handwritten signature in blue ink that reads "Richard Watt". The signature is stylized, with a large, looping "R" and a trailing flourish.

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Richard Watt

## Appendix A: Curriculum Vitae

### Richard Ian Watt

#### ACADEMIC DEGREES

- Ph.D. in Economics, Universidad Autónoma de Madrid, 31st October 1990.  
Thesis title: *La Calidad de la Fuerza Laboral: Un Análisis de Equilibrio (The Quality of the Labour Force: An Equilibrium Analysis)*.
- Master of Commerce in Economics (Hons.). University of Canterbury, 9th May 1985.  
Thesis title: *Aggregation and the Unpredictability of Wage Inflation*.
- Bachelor of Commerce. University of Canterbury, 2nd May 1984.

#### TEACHING POSITIONS

2019 – present	<i>Professor</i> , University of Canterbury
2008 – 2018	<i>Associate Professor</i> , University of Canterbury
2006 – 2007	<i>Senior Lecturer</i> , University of Canterbury
2000 – 2006	<i>Profesor Titular (Senior Lecturer with Tenure)</i> , Universidad Autónoma de Madrid.
1987 – 2000	<i>Profesor Asociado (Lecturer)</i> , Universidad Autónoma de Madrid.
1984	<i>Teaching assistant</i> , University of Canterbury. ECON 101 Tutorials.

Taught a large range of classes, including microeconomics at all levels, advanced financial economics, the economics of intellectual property, the economics of wine, the economics of risk and insurance, game theory, and environmental economics.

#### SABBATICALS AND VISITS TO OTHER UNIVERSITIES

1991	Visiting post-doctoral fellow. Department of Economics, Georgetown University (Washington, U.S.A.)
2004	Visiting Professor. Department of Applied Economics, Université de Paris X Dauphine, (Paris, France).
2005	Erskine Fellow, at the Department of Economics, University of Canterbury.
2009	Visiting researcher at the Max Planck Institute, Munich, Germany.
2010	Visiting researcher at the International Centre for Economic Research, Turin (Italy).

- 2011 Visiting researcher at the Max Planck Institute, Munich, Germany.
- 2011 Visiting researcher at the International Centre for Economic Research, Turin (Italy).

## 5. PUBLICATIONS

### *JOURNALS AND BOOKS*

- 1) 2021 (with Philip Gunby). “A New Approximation to the Risk Premium with Large Risks”. Forthcoming in *The Journal of Risk Finance*.
- 2) 2021. “The 2020 Nobel Memorial Prize in Economics: The Canterbury connection”, *New Zealand Economic Papers*, 55(2); 166-172.
- 3) 2021 (with Steve Agnew and Jane Kerr). “The Effect on Student Behaviour and Achievement of Removing Incentives to Complete Online Formative Assessments”, *Australasian Journal of Educational Technology*, 173-185.
- 4) 2021. (with Frank Mueller). “Optimal Pricing and Quality of Academic Journals and the Ambiguous Welfare Effects of Forced Open Access: A Two-Sided Model”. Forthcoming in *Managerial and Decision Economics*.
- 5) 2020. “Overlooked Results on the Competitive Firm under Output Price Risk: Alternative Sufficient Conditions for Downward Sloping Factor Demand Curves”, *Economics Letters*, 196; article 109507.
- 6) 2020 (with Philip Gunby). “Time is Money: An Economic Analysis of the Optimal Pacing Problem”, *Mathematical Social Sciences*, 108; 50-61.
- 7) 2020 (with Carlos Fernandez and Francisco Vazquez). “Social Influence on Software Piracy”, *Managerial and Decision Economics*, 41; 1211-24.
- 8) 2019 (with Richard Mumo). “Residential Insurance Market Responses After Earthquake: A Survey of Christchurch Dwellers”, *International Journal of Disaster Risk Reduction*, 40, article 101166; 1-6.
- 9) 2018 (with Frank Mueller-Langer). “How Many More Cites is a \$3000 Open Access Fee Buying You? Empirical Evidence From a Natural Experiment”, *Economic Inquiry*, 56(2); 931-54.
- 10) 2017 (with Seamus Hogan). “Are Athletes on the Right Track? The Effect of Availability of an All-Weather Athletics Track on Athletics Performance”, *Sport in Society*, 21(3); 546-57.
- 11) 2017 (with Richard Mumo). “An Investigation of Residential Insurance Demand-Side Reactions After a Natural Catastrophe: The Case of the 2010-11 Christchurch Earthquakes”, *Asia Pacific Journal of Risk and Insurance*, 11(2).
- 12) 2017 (with Francisco Vazquez). “An Analysis of Insurance Demand in the Newsboy Problem”, *European Journal of Operational Research*, 259(3); 1064-1072.
- 13) 2017 (with Francisco Vazquez and Ignacio Moreno). “Rationality and Honesty of Consumers in Insurance Decisions”, *Journal of Economics and Business*, 89; 36-46.
- 14) 2017. Licensing of Copyright Works, *The New Palgrave Dictionary of Economics*, DOI 10.1057/978-1-349-95121-5\_3033-1

- 15) 2016 (with Richard Mumo). “The Dual Insurance Model and its Implications for Insurance Demand and Supply Post-Christchurch Earthquakes in New Zealand”, *Insurance and Risk Management*, 83 (3-4); 135-67.
- 16) 2014 (with Francisco Vazquez and Ignacio Moreno). “The Effect of Contract Type on Insurance Fraud”, *Journal of Insurance Regulation*, 33(8); 1-34.
- 17) 2014. *The Economics of Copyright: A Handbook for Students and Teachers*, edited volume, Edward Elgar.
- 18) 2013 (with Francisco J. Vazquez). “Allocative Downside Risk Aversion”, *International Journal of Economic Theory*, 9(4); 267-77.
- 19) 2013. “Copyright Law and Royalty Contracts for Copyright”, in *Handbook of the Digital Creative Economy*, edited by R. Towse and C. Handke, Edward Elgar.
- 20) 2012 (with Francisco J. Vazquez). “The Effect of Prices on Risk Aversion”, *Theoretical Economics Letters*, 2(1); 40-44.
- 21) 2011. *The Microeconomics of Risk and Information*, ISBN 978-0-230-280809, Macmillan-Palgrave.
- 22) 2011. “The Economic Theory of Copyright Contracts”, *Journal of Intellectual Property Law*, 18(1); 173-206.
- 23) 2011 (with Francisco J. Vazquez). “Copyright Piracy as Prey-Predator Behaviour”, *Journal of Bioeconomics*, 13(1); 31-43.
- 24) 2009. “How Does Interest Rate Policy Affect Inflation? A Simple General Equilibrium Model With The Interest Rate As The Policy Instrument”, *Review of Economic Design*, 13; 345-60.
- 25) 2009 (with F. Vázquez). “Optimal Accident Compensation Schemes”, *Spanish Economic Review*, 11; 75-82.
- 26) 2009. “An Empirical Analysis of the Economics of Copyright: How Valid Are the Results of Studies in Developed Countries for Developing Countries?”, in *The Economics of Intellectual Property: Suggestions for Further Research in Developing Countries and Countries with Economies in Transition*, World Intellectual Property Organization Publication No. 1012(E); pp. 65-99.
- 27) 2008 (with Ruth Towse). *Recent Trends in the Economics of Copyright* (edited volume), Edward Elgar.
- 28) 2008 (with Henri Loubergé). “Insuring a Risky Investment Project”, in *Insurance, Mathematics and Economics*, 42; 301-310.
- 29) 2007, “What Can the Economics of Intellectual Property Learn From the Economics of Insurance?”, in *Review of Law and Economics*, Article 3, Issue 3.
- 30) 2006 (with Stan Liebowitz), “How Best to Remunerate Creators in the Market for Music: Copyright and its Alternatives”, in *Journal of Economic Surveys*, 20(4); 513-545.
- 31) 2006 (with Ruth Towse), “Copyright Protection Standards and Authors’ Time Allocation”, in *Industrial and Corporate Change*, 15(6); 995-1011.

- 32) 2006 (with F. Vázquez and I. Moreno), “Can Bonus-Malus Alleviate Insurance Fraud?”, in *Journal of Risk and Insurance*, 73(1); 123-51. Winner of the Witt Award for the best paper published in *Journal of Risk and Insurance* during 2006.
- 33) 2005, “Adverse Selection and the Legal Protection of Intellectual Property Rights”, in F. Leveque and H. Shelanski (Eds.), *Antitrust, Patent and Copyright*, Edward Elgar Publishing Ltd; pp. 127-48.
- 34) 2005, “A Unifying Theory of Copyright and Patent”, in *International Journal of the Economics of Business*, 12(3), 389-402.
- 35) 2005 (with Arthur Snow), “Risk Sharing and the Distribution of Copyright Collective Income”, in L. Takeyama, W. Gordon and R. Towse (Eds.), *Developments in the Economics of Copyright: Research and Analysis*, Edward Elgar Publishing Ltd; pp. 23-36
- 36) 2003 (with Wendy Gordon, Eds.) *The Economics of Copyright: New Developments in Research and Analysis*. ISBN 1 84376 263 3, Edward Elgar Publishing Ltd.
- 37) 2003 (with Jorge Alonso). “Efficient Distribution of Copyright Income”, in Gordon, W. and R. Watt (eds.), *The Economics of Copyright: New Developments in Research and Analysis*, Edward Elgar Publishing Ltd, pp. 81-103.
- 38) 2003. “Curtailling Ex-post Fraud in Risk Sharing Arrangements”, *European Journal of Law and Economics*, 16 (2), 247-263.
- 39) 2003 (with Carlos Rodriquez) “El Mercado Español de Carburantes: Un Análisis de Oligopolio”, *Economía Industrial*, 353, 123-8.
- 40) 2002. “A Generalized Oligopoly Model”, *Metroeconomica*, 53 (1), 78-85.
- 41) 2002. “Defending Expected Utility Theory”, *Journal of Economic Perspectives*, 16 (2), 227-228.
- 42) 2002 (with F. Vázquez). “The Price of Risk with Incomplete Knowledge on the Utility Function”, *Theory and Decision*, 53 (3), 271-287.
- 43) 2001 (with F. Vázquez and I. Moreno). “An Experiment on Rationality in Insurance Decisions”, *Theory and Decision*, 51 (3), 247-296.
- 44) 2000. *Copyright and Economic Theory: Friends or Foes?* ISBN 184064 3129. Edward Elgar Publishing Ltd.
- 45) 1999. “The Zero Fraud Indemnity Function for Insurance Contracts”, *Études et Dossiers*, 225, 147-164.
- 46) 1999 (with F. Vázquez). “A Theorem on Multi-Period Insurance Contracts Without Commitment”, *Insurance: Mathematics and Economics*, 24, 273-280.
- 47) 1997. “The Optimal Trading Partner for Reciprocal Insurance Treaties”, *Scandinavian Actuarial Journal*, 2, 97-112.
- 48) 1997 (with F. Vázquez). “Full Insurance, Bayesian Updated Premiums and Adverse Selection”, *The Geneva Papers on Risk and Insurance Theory*, 22 (2), 135-150
- 49) 1996 (with F. Vázquez). “Un Análisis Teórico-Comparativo de los Contratos de Seguros Bonus-Malus”, *Anales del Instituto de Actuarios 1995*, 139-161.
- 50) “Las Interrelaciones Entre la Microeconomía y la Macroeconomía: el Problema de la Agregación Consistente”, *Cuadernos de Economía*, 20, 437-456.



Translator (Spanish to English) for Oxford University Press of the 1997 and 2000 editions of *An Introduction to the Economics of Information: Incentives and Contracts*, by Inés Macho Stadler and David Pérez Castrillo (first published in 1994 by Ariel Economica).

#### *PAPERS PUBLISHED IN REVIEW OF ECONOMIC RESEARCH ON COPYRIGHT ISSUES*

- 51) 2018 (with Frank Muller-Langer). “Indirect Copyright Infringement Liability for an ISP: An application of the theory of the economics of contracts under asymmetric information”, *Review of Economic Research on Copyright Issues*, 15(2); 57-79.
- 52) 2015. “The Efficiencies of Aggregation: An Economic Theory Perspective on Collective Management of Copyright”, *Review of Economic Research on Copyright Issues*, 12(1/2); 26-45.
- 53) 2011. “Revenue Sharing as Compensation for Copyright Holders”, *Review of Economic Research on Copyright Issues*, 8(1); 51-97.
- 54) 2010. “Fair Copyright Remuneration: The Case of Music Radio”, *Review of Economic Research on Copyright Issues*, 7(2); 21-37.
- 55) 2010 (with Frank Muller-Langer). “Copyright and Open Access for Academic Works”, *Review of Economic Research on Copyright Issues*, 7(1); 45-65.
- 56) 2007. “Patent and/or Copyright for Software: What Has Been Done So Far?”, *Review of Economic Research on Copyright Issues*, 4(1); 3-14.
- 57) 2006. “Licensing and Royalty Contracts for Copyright”, *Review of Economic Research on Copyright Issues*, 3(1); 1-17.
- 58) 2004. “The Past and the Future of the Economics of Copyright”, in *Review of Economic Research on Copyright Issues*, 1(1), 151-172.
- 59) 2004. “A Comment: The ‘Copyright Factors’”, in *Review of Economic Research on Copyright Issues*, 1(1), 71-78.

#### *WORK IN PROGRESS*

- 1) (with B. Davies) Bundling or Separating of Independent Risks for Insurance Purposes.
- 2) “Some Similarities Between Greater Risk Aversion and Greater Downside Risk Aversion”.
- 3) “A Note on The Comparative Statics of Nash Bargaining Under Risk”.

#### **6. PRESENTATIONS AT INTERNATIONAL CONGRESSES**

- 1) “Old and New Results in Entrepreneurship Under Risk” (with Claudio Bonilla and Marcos Vergara), presented at the World Risk and Insurance Economics Congress, New York (USA), August 2020.
- 2) “On a New Paradigm of Optimal Insurance Demand and Savings in an Intertemporal Framework: Why is post-accident insurance so high?” (with Richard Mumo), presented at the American Risk and Insurance Association Annual Conference, San Francisco (USA), August 2019.
- 3) “Bundling and Insurance of Independent Risks” (with B. Davies), presented at the European Group of Risk and Insurance Economists Annual Seminar, London (UK), September 2017.

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- 4) “The Efficiencies of Aggregation: An Economic Theory Perspective on Collective Management of Copyright”, Invited Keynote Speech at the European Policy on Intellectual Property Congress, Glasgow (UK), September 2015.
- 5) “An Analysis of Insurance Demand in the Newsboy Problem” (with F. Vazquez), presented at the World Risk and Insurance Economics Congress, Munich (Germany), August 2015.
- 6) “Some Similarities Between Greater Risk Aversion and Greater Downside Risk Aversion”, presented at the International Congress “Risk and Choice: A Conference in Honour of Louis Eeckhoudt”, Toulouse (France), July 2012.
- 7) “The Effect of Contract Type on Insurance Fraud” (with F. Vazquez and I. Moreno), presented at the Behavioral Economics Workshop, University of Munich (Germany), December 2011.
- 8) “The Effect of Contract Type on Insurance Fraud” (with F. Vazquez and I. Moreno), presented at the Annual Congress of the European Group of Risk and Insurance Economists, Vienna (Austria), September 2011.
- 9) “Revenue Sharing as Compensation for Copyright Holders”, presented at the Annual Congress of the New Zealand Association of Economists, Wellington (New Zealand), June 2011.
- 10) “Allocative Downside Risk Aversion” (with F. Vazquez), presented at the World Risk and Insurance Economics Congress, Singapore, July 2010.
- 11) “Allocative Downside Risk Aversion” (with F. Vazquez), presented at the Annual Congress of the New Zealand Association of Economists, Auckland (New Zealand), June 2010.
- 12) “How Does an Increase in Risk Affect Insurance Demand? Experimental Evidence” (with Steve Tucker and Maros Servatka), presented at the Annual Congress of the Economic Science Association, Melbourne (Australia), February 2010.
- 13) “How Does an Increase in Risk Affect Insurance Demand? Experimental Evidence” (with Steve Tucker and Maros Servatka), presented at the Annual Congress of the European Group of Risk and Insurance Economists, Bergen (Norway), September 2009.
- 14) “The More The Merrier? Information and Information Gathering in Insurance Markets” (with Sam Mills), presented at the Annual Congress of the European Group of Risk and Insurance Economists, Toulouse (France), September 2008.
- 15) “The More The Merrier? Information and Information Gathering in Insurance Markets” (with Sam Mills), presented at the FUR International Congress, Barcelona (Spain), July 2008.
- 16) “A New Approximation to the Risk Premium With Large Risks”, presented at the Geneva Association of Risk and Insurance Economists Annual Congress, Cologne (Germany), September 2007.
- 17) “Copyright Piracy as Prey-Predator Behavior” (with F. Vázquez), 2007 Annual Congress of the Society for Economic Research on Copyright Issues, Berlin (Germany), July 2007.
- 18) “A More Reasonable Model of Insurance Demand: Clarifications and Further Results” (with H. Loubergé), Annual Congress of the New Zealand Association of Economists, Christchurch (New Zealand), June 2007.

- 19) “A Note on The Effect of an Increase in the Probability of Loss When Risk is Endogenous” (with H. Loubergé), Western Risk and Insurance Association, Santa Barbara (USA), January 2006.
- 20) “A Note on The Effect of an Increase in the Probability of Loss When Risk is Endogenous” (with H. Loubergé), World Risk and Insurance Economics Congress, Salt Lake City (USA), August 2005.
- 21) “On the Demand for Budget Constrained Insurance” (with H. Loubergé), 31st Annual Seminar of the European Group of Risk and Insurance Economists, Marseille (France), September 2004.
- 22) “On the Demand for Budget Constrained Insurance” (with H. Loubergé), 42nd Annual Congress of the Risk Theory Society, New York (USA), April 2004.
- 23) “How Different are Copyright and Patent? How Different Should They Be?”, International Conference on Antitrust, Patent and Copyright, Paris (France), January 2004.
- 24) “A Simple Model of Insurance with Direct Utility”, 30th Annual Seminar of the European Group of Risk and Insurance Economists, Zurich (Switzerland), September 2003.
- 25) “Risk Sharing and the Distribution of Copyright Collective Income” (with Arthur Snow), 2nd Annual Congress of the Society for Economic Research on Copyright Issues, Northampton, MA. (USA), June 2003.
- 26) “Can Bonus-Malus Alleviate Insurance Fraud?” (with F. Vázquez and I. Moreno), International Insurance Fraud Congress. Insurance Claim Fraud: Developing the Models and Mining the Data, Newport, Rhode Island (USA), November 2002.
- 27) “Can Bonus-Malus Alleviate Insurance Fraud?” (with F. Vázquez and I. Moreno), 29th Annual Seminar of the European Group of Risk and Insurance Economists, Birmingham (UK), September 2002.
- 28) “Efficient Distribution of Copyright Income” (with J. Alonso), 1st Annual Congress of the Society for Economic Research on Copyright Issues, Madrid (Spain), May 2002.
- 29) “Optimal Accident Compensation Schemes” (with F. Vázquez), 40th Annual Congress of the Risk Theory Society, University of Illinois, Champagne (U.S.A.), April 2002.
- 30) “A Comparison of Two Insurance Contract Formats: Experimental and Theoretical Evidence” (with F. Vázquez and I. Moreno), 28th Seminar of the European Group of Risk and Insurance Economists, University of Strasbourg (France), September 2001.
- 31) “An Experiment on Rationality in Insurance Decisions” (with F. Vázquez and I. Moreno), 10th Congress of Foundations of Uncertainty and Rationality, University of Turin (Italy), May 2001.
- 32) “Wholesale Natural Gas Markets in Countries Without Production: The Case of Spain” (with J. Quinto), Transport and Public Utilities Group, American Economic Association Annual Meetings, New Orleans (USA), January 2001.
- 33) “Support Contingent Insurance: The Optimal Deductible and Dominance of the Traditional Contract” (with F. Vázquez), 27th Seminar of the European Group of Risk and Insurance Economists, Rome (Italy), September 2000.

- 34) “Support Contingent Insurance: The Optimality of Supplementary Coverage” (with F. Vázquez), 38th Annual Congress of the Risk Theory Society, University of Minnesota, Minneapolis (USA), April 2000.
- 35) “The Zero Fraud Indemnity Function for Insurance Contracts,” 26th Seminar of the European Group of Risk and Insurance Economists, Madrid (Spain), September 1999.
- 36) “The Zero Fraud Indemnity Function for Insurance Contracts,” American Risk and Insurance Association Annual Congress, Vancouver (Canada), August 1999.
- 37) “Spanish Electricity Market Organization” (with J. Quinto), American Economic Association Annual Meeting, New York (USA), January 1999.
- 38) “The Welfare Implications of the Underlying Industrial Configuration: A Generalized Version of the Generalized Stackelberg Oligopoly Model,” Symposium on Economic Theory, Universidad Autónoma de Barcelona (Spain), December 1998.
- 39) “Sufficient Conditions for Insurance Premiums with Unknown Utility Function” (with F. Vázquez), 25th Seminar of the European Group of Risk and Insurance Economists, University of Vienna (Austria), September 1998.
- 40) “On the Optimal Regulation of Oligopolistic Industries” (with J. Quinto), American Economic Association Annual Meetings, Chicago (USA), January 1998.
- 41) “Implicit Client Sorting and Bonus-Malus Contracts” (with F. Vázquez), 35th Annual Congress of the Risk Theory Society, University of Alabama, Tuscaloosa (USA), April 1997.
- 42) “Endogenous Premium Insurance Contracts and Adverse Selection” (with F. Vázquez), 23rd Seminar of the European Group of Risk and Insurance Economists, University of Hannover (Germany), September 1996.
- 43) “The Optimal Trading Partner for Reciprocal Insurance Treaties,” American Risk and Insurance Association Annual Congress, Philadelphia (USA), August 1996.
- 44) “The Optimal Trading Partner for Reciprocal Insurance Treaties,” 22nd Seminar of the European Group of Risk and Insurance Economists, Université de Genève, Geneva (Switzerland), September 1995.

## 7. OTHER (SELECTED) SEMINARS

- “Revenue Sharing as Copyright Remuneration”, Department of Economics, University of Eastern Piedmont, Alessandria (Italy), September 2010.
- “Can Bonus-Malus Alleviate Insurance Fraud?” Department of Economics, University of Canterbury, Christchurch (New Zealand), August 2004.
- “The Intersection between Patent and Copyright”, XVII International Summer School on “Intellectual Property, Innovation and Competition”, University of Siena, Siena (Italy), July 2004.
- “A Simple Introduction to the Economics of Copyright”, Department of Applied Economics, Université de Paris X (Dauphine), Paris (France), February 2004.
- “Price Setting for Intellectual Property”, V International SGAE Conference on Intellectual Property: Competition and Collective Management, Madrid (Spain), November 2001.

“Social Welfare in a Generalized Oligopoly Model”, Department of Economics, Monash University, Melbourne (Australia), August 2000.

“Horizontal Mergers in Oligopolistic Industries: The Herfindahl-Hirshman Index and Social Welfare” (with J. Quinto), Department of Economics, Universidad San Pablo CEU, Madrid (Spain), June 2000.

“The Zero Fraud Indemnity Function for Insurance Contracts”, Department of Economics, University of Canterbury, Christchurch (New Zealand), July 1999.

“Insurance Company Implicit Client Selection in Bonus-Malus Contracts” (with F. Vázquez), Department of Economic Analysis, Universidad Autónoma de Madrid, Madrid (Spain), February 1997.

“Intertemporal Insurance Contracts and Adverse Selection” (with F. Vázquez), The Institute of Law and Economics, Universidad Carlos III de Madrid, Madrid (Spain), October 1996.

“Market Failure and the Theory of Monopoly and Oligopoly”, P.E.R.E., Faculty of Law, Universidad Autónoma de Madrid, Madrid (Spain), October 1995.

## 8. RECENT RESEARCH GRANTS

2020. Grant from New Zealand’s Ministry of Business, Innovation and Employment, the New Zealand Space Agency, to investigate the insurability of third party risks of in-orbit collisions of satellites launched from New Zealand.

2013 (with F. Mueller). One year grant from NBER for research on the effect of the hybrid open access format of journal publishing upon journals and authors, especially upon citation rates.

2011-12 (with F. Mueller). “TILEC IIPC Grant: Two-sided markets, academic publishing and open access.” One year grant from University of Tilburg – Tilburg Law and Economics Centre (Holland) to finance theoretical research on academic publishing.

2010-11 (with F. Vazquez and I. Moreno). “MAPFRE Research Fund: Experiments and Insurance Fraud”. One year grant from MAPFRE (Spain) to carry out experimental research on insurance fraud.

2009 (with B. Manley). “Forestry Insurance, Risk Pooling and Risk Minimising Options”, Ministry of Agriculture and Forestry (MAF) Project CM-09 under MAF POL 0809-11194. One year grant from the MAF (New Zealand) to research on risks and insurance in forestry.

## 9. OTHER ACCOMPLISHMENTS

2014-17, PhD thesis supervisor of Richard Mumo, University of Canterbury. Thesis on the insurance market effects of natural catastrophes.

2009, Member of Special Group of Experts, chosen by the *World Intellectual Property Organization* to develop a methodology to evaluate the economic effects of copyright. Group met in Geneva (Switzerland).

2008-2009, President of the European Group of Risk and Insurance Economists.

2004-present, General Secretary of the Society for Economic Research on Copyright Issues.

2004-present, Managing Editor, Review of Economic Research on Copyright Issues.

2005-present, Member of the Scientific Committee for the Ernst-Meyer Prize in the Economics of Insurance (international prize offered annually to the best PhD thesis in insurance economics, by the Geneva Association).

2002-04, President of the Society for Economic Research on Copyright Issues.

2002, Member of Special Group of Experts, chosen by the *World Intellectual Property Organization* to develop a methodology to evaluate the economic impact of copyright on national economies. Group met in Helsinki (Finland).

2001, founder of the Society for Economic Research on Copyright Issues.

2000-03, PhD thesis advisor for Ignacio Moreno, in the Department of Economics, Universidad Autónoma de Madrid. Thesis concerning optimal fraud in insurance models.

Submissions referee for Scandinavian Actuarial Journal, Journal of Risk and Insurance, Economic Journal, American Economic Review, Journal of Institutional Economics, and Geneva Papers on Risk and Insurance Theory (among others).

## Appendix B: Materials Relied Upon

(This list is in addition to materials cited directly in the report and Appendices and those identified as materials relied upon in Appendix F)

### **Academic Books, Journal Articles, and other Academic Literature**

- Akerlof, G. (1970), “The Market for Lemons: Quality Uncertainty and the Market Mechanism”, *Quarterly Journal of Economics*, 89; 488-500.
- Katz, M. and H. Rosen (1991), *Microeconomics*, Irwin.
- Lumby, S. and C. Jones, *Corporate Finance: Theory and Practice*, 9<sup>th</sup> Edition, Cengage Learning.
- Mas Collé, A., M. Whinston and J. Green (1995), *Microeconomic Theory*, New York: Oxford University Press.
- Motta, M. (2004), *Competition Policy: Theory and Practice*, Cambridge MA: Cambridge University Press.
- Page, W. (2021), *Tarzan Economics: Eight Principles for Pivoting Through Disruption*, UK: Simon & Schuster.
- Serrano, R., R. Vohra and O. Volig (2001), “On the Failure of Core Convergence in Economies with Asymmetric Information”, *Econometrica*, 69(6), pp. 1885-1696.
- Vohra, R. (1999), “Incomplete Information, Incentive Compatibility and the Core”, *Journal of Economic Theory*, 86, pp. 123-147.
- Wilson, R. (1978), “Information, Efficiency and the Core of an Economy”, *Econometrica*, 46(4), pp. 807-816.
- H. Payton Young (1988), “Individual Contribution and Just Compensation”, Chapter 17 in A.E. Roth (ed.) *The Shapley Value: Essays in Honor of Lloyd S. Shapley*, Cambridge: Cambridge University Press.

### **Restricted Documents**

#### 16-CRB-0004-PR (2023-2027)

- Written Direct Testimony of Steve Bogard
- Written Direct Testimony of Jamie Floyd

B-1

*Written Direct Testimony of Richard Watt on Behalf of Copyright Owners*  
*Dkt No. 21-CRB-0001-PR (2023-2027)*

- Written Direct Testimony of Angela Hunte
- Written Direct Testimony of Autumn Rowe
- Written Direct Testimony of Jimmy Yeary
- Written Direct Testimony of JW Beekman
- Written Direct Testimony of Peter Brodsky
- Written Direct Testimony of Tom Kelly
- Written Direct Testimony of David Kokakis
- Written Direct Testimony of Annette Yocum
- Written Direct Testimony of Jeffrey A. Eisenach
- Written Direct Testimony of Robin Flynn

Other proceedings

- Final Determination, Determination of Rates and Terms for Digital Performance of Sound Recordings and Making of Ephemeral Copies to Facilitate Those Performances (Web V), Docket No. 19-CRB-0005-WR (2021-2025) (July 22, 2021)

**Public Documents**

- As cited in the report



## Appendix C: Shapley modelling details

- (157) Shapley models have been developed and presented before the Judges on multiple occasions, including the previous Phonorecords rate-setting proceeding. I therefore take it as given that the Judges are familiar with the Shapley methodology, and the fact that a Shapley model is indeed a correct and reasonable construct for determining a rate for the license under discussion. Nevertheless, I will refresh the Judges’ memories here of the main points.
- (158) The issue facing the Judges can be summarized down to the question of how much of interactive music streaming revenue should be paid to secure the license to the musical works copyright. Thus, we can simply frame the question as a search for a particular fraction of total interactive music streaming revenue, which we shall refer to as the musical works “rate”. For reasons set out and discussed in the main body of this report, the Judges should set a rate that fairly and unbiasedly represents the contribution of the musical works copyright to the overall value of the business of interactive music streaming. The Shapley methodology stands out as the best way forward for calculating such a rate.
- (159) The Shapley methodology removes from the analysis any form or degree of abuse of market power and values inputs to a joint production process in strict accordance with their respective contributions to the total surplus of the joint venture. The more valuable an input is in terms of its contribution to the creation of surplus, the higher will be its relative Shapley recompense. The model works by considering all of the possible sequential “arrival” orderings of the entire set of independent “inputs”, or in our case, “owners of inputs”, here in general referred to as “players”, until all players are present, that is, we have arrived at the “grand cohort”. At each sequential step in that process, partial cohorts are established, containing a sub-set of all of the players. For partial cohort, starting with the cohort of only one player, the surplus that is created by that sub-cohort of players is calculated. When a new player is admitted in turn to the cohort, and the cohort’s surplus changes, the amount of surplus change is registered as the marginal contribution of the newly added player. Then, over all possible arrival orderings (cohort sequences) leading up to the grand cohort, the total marginal contribution of each player independently is summed up and averaged. Those average marginal contributions are known as the players’ Shapley values, and

by construction, the sum of the Shapley values of all players is equal to the surplus of the grand cohort.

- (160) It is important to notice that, upon being added to a cohort, a player cannot then withhold their input from the existing cohort members. Likewise, once included in a cohort, no player can then withdraw their input when the cohort grows. Each cohort member's input is made available to the entire cohort. Thus, there is no room at all for strategic play by any players in the Shapley process.
- (161) As can be seen, the construction of the Shapley values only takes into account the marginal contributions of a given player's input, at every possible sequence of construction of the grand cohort. By averaging these marginal values for each player, the methodology essentially assumes that each sequence of construction of the grand cohort is equally likely, and in that case, the average contribution of a player over all possible orderings of the grand cohort (i.e. their Shapley value) gives a fair and unbiased calculation of the overall relative value of that input. And since the sum of Shapley values equals the surplus of the grand cohort, the fair and unbiased recompense for each input is that they receive their Shapley value.
- (162) I provide model variation with up to nine players, which involves 362,880 (9 factorial) different "arrival orderings" that need to be considered. While this is a daunting task, it can be overcome by programming the model within Excel spreadsheet software. For each version of the model that I present herein, I thus calculate the total combined surplus or net revenue (total revenue of the market, less total relevant costs) that is generated in each and every one of the 362,880 different Shapley cohorts of players.

#### A. The single music publisher Shapley model

- (163) Any cohort that does not contain the (assumed) single music publisher (who supplies the musical works copyright), at least one service, and at least one label, earns no surplus. However, two different versions of the model have been constructed, depending on a simple parameter choice. In one version (that which I consider most appropriate), adding players (labels and services) to a cohort that includes the music publisher increases the total surplus created by that cohort. In the

second version of the model, there is no cohort surplus unless all of the labels are available, so adding labels when there are fewer than all of them, does not affect total surplus, which remains at 0. I discuss these two versions of the model in detail below.

- (164) As the Judges are well aware, the Shapley model calculates how surplus should be shared, and therefore it requires that each player's relevant costs be taken into account. These costs are first subtracted from total revenue to determine shareable surplus, and then each player is reimbursed their relevant costs as a part of their share of surplus. It therefore becomes very important that relevant costs are correctly calculated. While the model that has been developed can accommodate any particular assumption on the value of relevant costs, some guidance as to what is reasonable (given the current economic and accounting situation of all of the players) is given in the main body of this report.
- (165) Finally, again in many prior rate-setting proceedings, there has been general agreement that the amount of revenue that the services ascribe to their music streaming businesses does not fully capture the true magnitude of what music streaming contributes to their larger business models. That "revenue displacement" occurs (where either streaming acts as a loss-leader for gains in other areas of the overall business model, or where streaming revenue is displaced over time, by under-pricing in the present in order to increase revenue in the future) seems to be generally agreed. Given the existence of such practices, it is natural to bring revenue displacement into the Shapley model as income that is retained unilaterally by the services rather than adding to the overall shareable revenue pot. The model that I have developed is able to accommodate revenue displacement, to whichever amount the analyst considers appropriate. Again, some considerations as to exactly how large the revenue displacement should be are given below.

#### B. Marginal contributions to revenue and substitution between players

- (166) The main difficulty in a large Shapley model such as that which I have developed lies in the need to assign a total cohort value for the revenue that is earned by each and every cohort within each and every arrival ordering. Since, with up to 9 players, there are up to 362,880 different arrival orderings, and each arrival ordering contains 9 different cohorts (each individual player is added sequentially to the set of players that have already arrived), there are  $362,880 \times 9$  (more than 3

million) different cohorts to deal with (although many of these cohorts will be common across the different arrival orderings). The only reasonable way to deal with this issue is by a few reasonable assumptions. Specifically, I assume the following:

1. The services are identical in as much as the marginal contribution to any given cohort is concerned. In other words, each service commands an equal market share.
2. The record labels are identical in as much as the marginal contribution to any given cohort is concerned. In other words, each label commands a musical catalogue that is equally valued by the services.
3. The marginal contributions of any player type may diminish as more of them arrive (diminishing marginal product of players).
4. There is some degree of substitutability between services, and likewise between the labels. That is, should a service close down, some fraction of its customers diverts to other existing services, and the rest are lost to the joint venture. Or, should a new service join a cohort, some of the customers of the existing services divert to the new one (i.e. the new service does not necessarily bring only entirely new customers). Should a label become unavailable (to all services existing within a cohort), then a certain fraction of total revenue is lost (this captures the lower willingness to pay of streaming consumers for a smaller total repertory). Or, should a new label join a cohort, then total revenue increases in an amount that represents the increased value for the larger total repertory.
5. Assume that the number of labels that are included in the model is  $\hat{L}$ , the number of services that are included is  $\hat{S}$ , and of course (for now) the number of publishers is set to 1, where the sum of all three of these is no greater than 9.
6. If all of the available players are present in a cohort (i.e. the grand cohort), then the total revenue that is generated is at its maximal value, which is denoted by  $\hat{R}$ .

(167) All of these assumptions are brought together in the following equation, which represents the value of revenue that is generated by a cohort that includes the single musical works copyright

supplier (the publisher), together with  $S$  services, and  $L$  sound recording copyright suppliers (labels):<sup>76</sup>

$$R(S, L) = \frac{L^\alpha S^\beta}{\hat{L}^\alpha \hat{S}^\beta} \times \hat{R}$$

Notice the following about this expression:

1. If the model lacks any of any one type of player, then cohort revenue is 0.
2. If there are fewer than all of each type of player, then cohort revenue is smaller than its maximal value.
3. If all of each type of player are present in the cohort (the “grand cohort”), then revenue is equal to its maximal value.
4. The parameters  $\alpha$  and  $\beta$ , which are both non-negative and no larger than 1, capture the degree of diminishing returns to, respectively, labels and distributor services. These two parameters also capture the degree to which labels and services, respectively, are substitutable for other labels or services. This point is discussed in greater detail below.

### C. On the “must have” nature of labels

(168) Above in the main report I have outlined the concept of “must have” as the Judges have applied it in prior rate-setting procedures. There, I have noted that it is far more reasonable to apply the “must have” criterion to labels that are actually present in a cohort, rather than all of them whether or not they are present in a cohort. Never-the-less, the Shapley model that I employ can assume either definition of “must have.” This is done using a parameter,  $k$ , that only takes the value 0 or

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<sup>76</sup> My “revenue” function is in fact a standard “production” function form, known as the Cobb-Douglas function. Thus, my model can be interpreted as one in which two inputs (besides the publisher), concretely “labels” and “services”, combine to “produce” revenue. The use of the Cobb-Douglas function is extremely embedded within a huge literature dealing with many different applied economics problems, since it gives a very general, and very natural, way in which the relationships between inputs, and the degree to which there is diminishing returns to inputs, can be captured such that they provide a very close empirical fit to actual situations in which inputs are employed to generate an output. This functional form is not restricted only to production types of problems. For example, the Judges may recognize that in the Nash bargaining problem, the solution is found by maximizing the “Nash product”, which also takes exactly the Cobb-Douglas form.

1 (as desired by the analyst), thereby defining two different versions of the present (single publisher) model.

- (169) If  $k$  is set equal to 0, and assuming the publisher is included in the cohort, then the model sets cohort revenue equal to  $R(S, L)$  as above. In this scenario, any cohort of players that includes at least one label (and of course at least one service, and the publisher) will earn a positive profit. In such a cohort, all services that are present are assumed to license the musical catalogues of all of the labels that are present. That is, the services all offer the same total repertory of music to subscribers, and thus they compete on equal footing in regards to their musical libraries (i.e. none of the available labels can withhold their license from any of the available services). Notice then, that in the scenario  $k = 0$ , the entire set of labels that are chosen to be players in the model are not required for positive profit. Only the labels that are actually present in a cohort are “must haves,” and indeed they are all licensed.
- (170) On the other hand, if  $k$  is set equal to 1, then the model understands that the musical catalogues of all of the labels are strict “must haves,” regardless of whether they are available in the cohort in question or not. In this scenario, if a cohort includes only some of the labels (along with the publisher and at least one service), then by default the model sets the revenue that the cohort will earn to 0, that is  $R(S, L) = 0$  if  $L < \hat{L}$ . With  $k = 1$ , only cohorts that include all of the labels that are included in the game can generate positive revenue, and in that case the revenue is given by  $R(S, \hat{L})$ , and 0 otherwise. Thus, the option of  $k = 1$  captures a situation of the labels being strict “must haves” in the sense that the Judges appear to have understood in the past. As I have discussed above, my preferred understanding of the “must have” nature of labels is that which corresponds to  $k = 0$  in my Shapley model, but never-the-less, in the main report I provide several calculated situations with the assumption  $k = 1$ , purely for comparison.
- (171) The revenue generating function captures the incremental nature of revenue as more services or labels are added (under the scenario  $k = 0$ ). If all available players are present, then 100% of total revenue is available to be shared. On the other hand, if there are fewer than all of the players, then less than 100% of total revenue is available.

- (172) Finally, the term  $\beta$  captures the degree to which the services substitute for each other, and likewise  $\alpha$  captures the substitutability between labels. It is assumed that both of these parameters take values between 0 and 1, but they need not be the same number, and neither must they sum to any particular value. To illustrate, take the extreme case of  $\alpha = 0$  (resp.  $\beta = 0$ ). Under that assumption,  $L^\alpha = L^0 = 1$  (resp.  $S^\beta = S^0 = 1$ ) for any number of labels (resp. services).<sup>77</sup> That is, the same total revenue is earned independently of how many labels (resp. services) are present, or the musical catalogues of the different labels (resp. the services) are perfect substitutes for each other. This situation represents a situation in which labels (resp. different entire services) have no “market power” at all, since full revenue is earned by only one, and any one, of them. In other words, the loss of any given label (resp. the loss of any given service) does not reduce the number of customers that are served, that is, 0% of the customers of the services decide to leave interactive streaming if any of the labels becomes unavailable, or 100% the customers of a service that is lost simply relocate to other services. On the other hand, the assumption  $\alpha = 1$  (resp.  $\beta = 1$ ) delivers a situation in which there is no substitutability at all between the labels (resp. the services), that is, each label (resp. each service), brings with it a unique set of consumers, all of which are lost if that label (resp. service) is not present. This second situation reflects maximal “market power” by the labels (resp. services), in the sense that the loss of a label or of a service brings with it a loss of a set of customers from streaming, either those who absolutely required the repertory of the lost label (and who find nothing of interest in the remaining repertory) or those who only desire to subscribe to a specific service that is lost and no other.
- (173) It should be noted that in the case where  $k = 0$  none of the labels or services, independently, are veto players in the sense that they are absolutely necessary for there to be any positive profit, unless the maximum available of any given player type is set to 1. Total non-substitutability only implies that without one particular player (publisher, service or label) total revenue is lowered compared to if that player were present.

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<sup>77</sup> The case of  $\alpha = 0$  together with either  $P = 0$  or  $L = 0$  (and likewise  $\beta = 0$  with  $S = 0$ ) needs to be dealt with separately, since with  $L = 0$ ,  $P = 0$  or  $S = 0$  it is necessary that  $R(P, S, L) = 0$ , regardless of the value of the super-index, and yet the mathematical convention is  $0^0 = 1$ . In the Shapley model that I employ, revenue is forced to equal 0 for all super-index values whenever there are either no labels, no publishers, or no services present.

#### D. A few examples of substitutability

- (174) To examine substitutability, it is useful to take a simplified situation with two players, which I will do using services and labels (although publishers could be substituted for labels). Any number of combinations are possible for the different values of  $L, S, \alpha, \beta$ , but in order to see the effects of the parameter values in action, here I present a few relevant examples graphically. In all of these examples, I assume that there are between 1 and 4 labels and likewise for services. It is also assumed that  $k = 0$ , that is, labels are not all strict “must-haves,” so that positive revenue is possible without all  $\hat{L}$  labels present.<sup>78</sup> In the graphs that follow, the vertical axis measures revenue (with maximal revenue,  $\hat{R}$ , normalized to 1). The horizontal axis counts the number of labels present in the cohort (between 1 and 4). It is also assumed that the number of services is between 1 and 4. The orange dots represent the case of one service being present in the cohort, green dots represent 2 services present, red dots is 3 services present, and blue dots is 4 services present.
- (175) Example 1:  $\alpha = \beta = 1$  (so that there is no substitution between labels, and no substitution between services). In this example, it can be seen that adding a label gives exactly the same impact on revenue as does adding a service. Joining the dots of a given colour gives straight lines showing that the impact on revenue of additional labels is constant (given a set of services). On the other hand, taking any set of vertically organised dots, we see that the vertical distance from one to the next is always the same (at any given set of labels), which shows how adding services has a constant impact upon revenue.

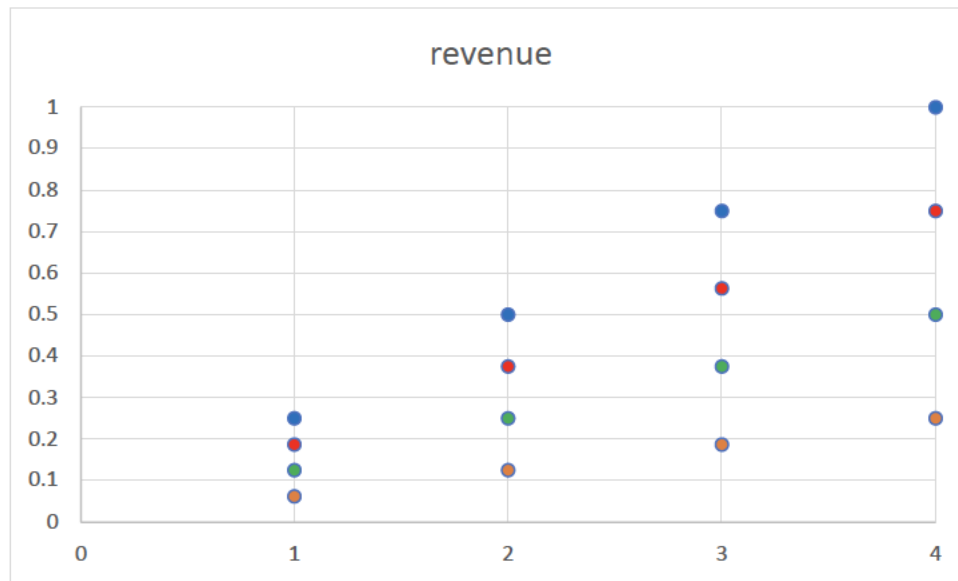
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<sup>78</sup> Making the labels “must-haves” simply places all the dots at 0 for all choices of the number of services, for  $L \in \{1,2,3\}$ , so that the only dots with positive revenue are all located above  $L = 4$ .



Chart 1

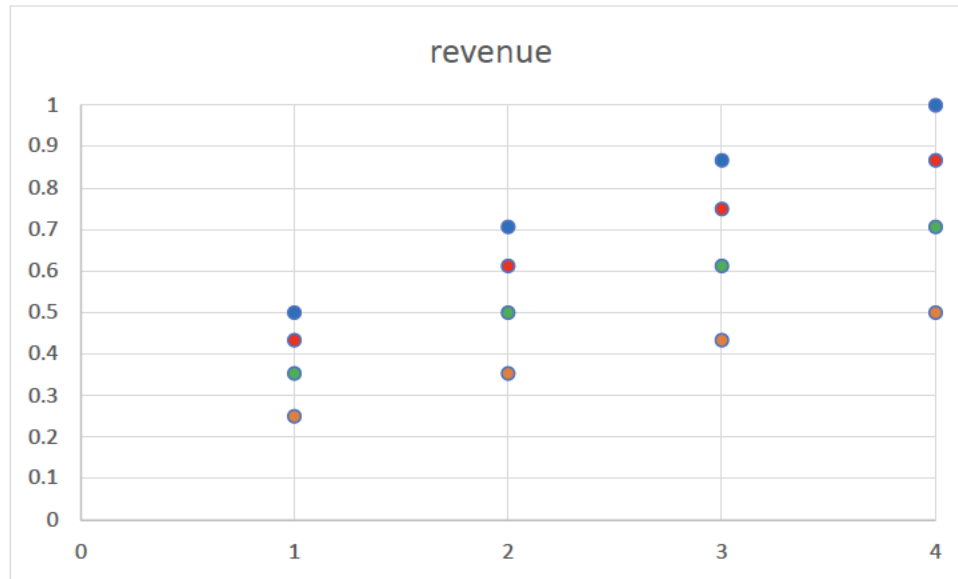
**The effect upon revenue of adding labels or services  
when both are perfectly non-substitutable**



- (176) Example 2:  $\alpha = \beta = 0.5$  (adding either labels or services has diminishing returns on revenue, which represents partial substitutability between them). Now joining the dots of a given colour gives curves that are concave, so as labels are added (to a given set of services), the increments in revenue are each time less. Similarly, as one moves up through the dots that are lined up vertically, each increment in revenue is smaller than the one before. This captures the same diminishing returns feature for services, given a set of labels.

Chart 2

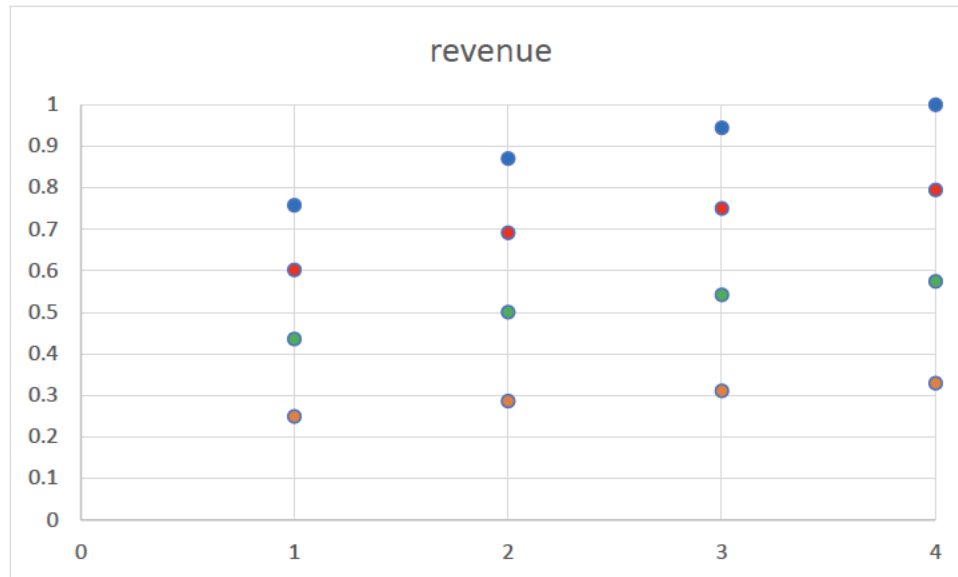
**The effect upon revenue of adding labels or services when both are partially, and equally, substitutable**



- (177) Example 3:  $\alpha = 0.2, \beta = 0.8$  (adding labels gives a smaller impact on revenue than does adding services, but both have diminishing returns. Services are highly non-substitutable, labels are very substitutable). Now the lines joining dots of a given colour are almost flat, showing that labels are very substitutable among themselves, or each additional label (beyond the first) adds little to revenue, and still adds less to revenue than the immediately previously added label. As far as services go, the dots that are vertically organised at any given number of labels are now almost the same distance apart, regardless of how many labels there are (i.e. regardless of which set of vertical dots we consider). This shows that by making services highly non-substitutable, they have a large (and almost constant) impact on revenue as they are added.

Chart 3

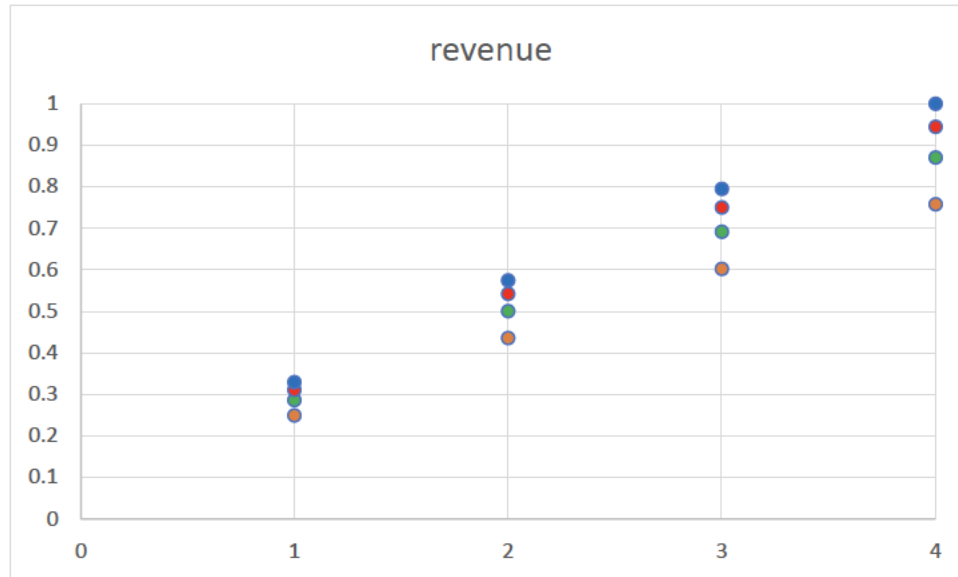
**The effect upon revenue of adding labels or services  
when labels are highly substitutable and services are highly non-substitutable**



- (178) Example 4:  $\alpha = 0.8, \beta = 0.2$  (adding services gives a smaller impact on revenue than does adding labels, but both have diminishing returns. Services are very substitutable, labels are very non-substitutable). Each set of vertically ordered dots are now all close together, representing that when services are highly substitutable, each additional service adds very little to total revenue (for any given number of labels). Each set of dots of a given colour (so holding the number of services constant) is now close to linear again, so adding labels has a large and almost constant impact upon revenue when labels are assumed to be highly non-substitutable.

Chart 4

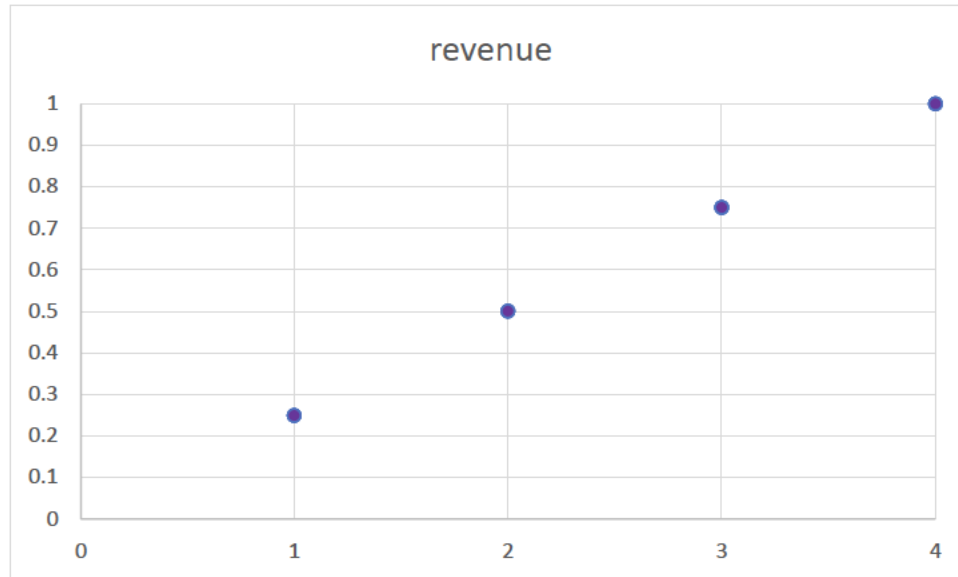
**The effect upon revenue of adding labels or services  
when labels are highly non-substitutable and services are highly substitutable**



- (179) Example 5:  $\alpha = 1, \beta = 0$  (labels are fully non-substitutable, services are fully substitutable). Here we can see that all of the dots coincide one on top of the other for any number of labels (and so the dots are shown here in a neutral color – purple), indicating that adding services has no effect at all on revenue so long as there is one of them. This reflects the assumption of services being fully substitutable between themselves. On the other hand, adding labels gives their maximal, and equal, impact on revenue, since there is no substitution between them. The line joining the dots is perfectly straight, so each additional label added has the same impact on revenue.

Chart 5

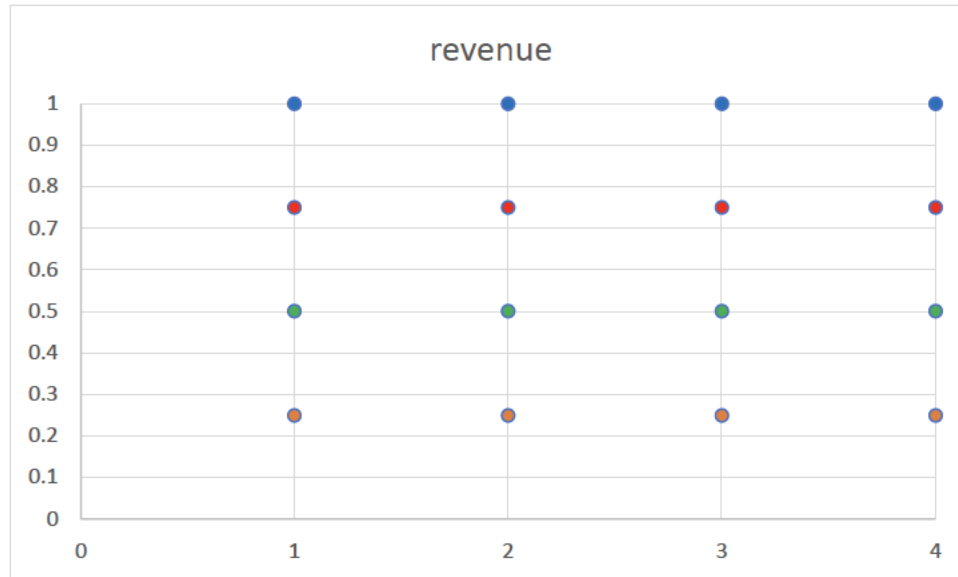
**The effect upon revenue of adding labels or services  
when labels are perfectly non-substitutable and services are perfectly substitutable**



- (180) Example 6:  $\alpha = 0, \beta = 1$  (full substitutability between labels, no substitutability at all between services). In this final example, we can see that the dots of each colour all lie on a perfectly flat line. Thus, as we add labels to a given set of services, there is no impact at all upon revenue. On the other hand, each horizontal line of dots is exactly the same distance from the one immediately below it, indicating that each additional service adds exactly the same additional revenue (which is equal to one-quarter of the total grand cohort revenue).

Chart 6

**The effect upon revenue of adding labels or services  
when labels are perfectly substitutable and services are perfectly non-substitutable**



#### E. Costs

- (181) The next thing to add into the model are the admissible costs of each participant. This is done by simply calculating, from actual financial documents of actual players in the streaming market, the dollar amounts of the relevant costs. Since the model assumes that each service is identical to each other service, each label is identical to each other label, and each publisher is identical to each other publisher, the industry costs for each player type are assumed to be shared equally over the players of that type that are present in a cohort.
- (182) Only relevant costs are admissible, Service music content costs are omitted from the model since they are precisely what is determined in the model. Costs that are unrelated to securing a license, but that are also not for the benefit of the joint venture also need to be omitted.
- (183) Each player has costs of participating in a cohort, and those costs are important in calculating the surplus generated by the cohort, and therefore, the marginal surplus generated by a given player.

We can observe the costs of the players only in the grand cohort, because that is what actually exists, and we need to use that information to estimate the costs in partial cohorts, in which revenue is lower than in the grand cohort. When a business with many different revenue sources needs to allocate costs among the different business lines, it is customary to “straight-line” the costs, that is, to allocate costs according to how revenue within the firm is distributed. So, a business line with a greater fraction of total firm revenue would be allocated an equally greater fraction of total firm costs. Notice that this does not assume costs to be entirely variable, it only assumes that costs fall in conjunction with where revenue is earned. Even if all the costs of a business were fixed, the firm can still allocate those costs across different business lines in fractions that are given by the share of total firm revenue in each business line. The Shapley model that I have developed follows this general principle.

- (184) Assume that the industry costs for streaming with the grand cohort (which is what we observe in the real-world) are  $\hat{T}$  dollars. Those are therefore the costs of the services that are required to generate  $\hat{R}$  dollars in streaming revenue. It is assumed that the total streaming service costs when revenue is  $R < \hat{R}$  is equal to  $\frac{R}{\hat{R}} \times \hat{T} = \frac{R\hat{T}}{\hat{R}}$ , that is, costs are discounted according to the relative size of the overall business. This aggregate cost is shared equally over all of the services that are present in the cohort.
- (185) In exactly the same way, if  $\hat{W}$  is the industry costs for labels with the grand cohort, so that in a cohort with  $L$  labels and revenue of  $R$ , the total costs of all of the labels combined is  $\frac{R\hat{W}}{\hat{R}}$ , which is shared equally over the labels in the cohort. Finally, the industry costs of the publisher (assuming just one for simplicity) with the grand cohort are  $\hat{Y}$ , so in any cohort in which the publisher is present and revenue is  $R$ , the publisher’s costs are  $\frac{R\hat{Y}}{\hat{R}}$ .
- (186) The surplus that is created in the streaming market by a cohort that includes the publisher along with  $S$  services and  $L$  labels, assuming the case  $k = 0$ , is

$$R(S, L) - \frac{R(S, L)\hat{T}}{\hat{R}} - \frac{R(S, L)\hat{W}}{\hat{R}} - \frac{R(S, L)\hat{Y}}{\hat{R}} = \frac{R(S, L)}{\hat{R}} \left( \hat{R} - (\hat{T} + \hat{W} + \hat{Y}) \right)$$

Notice that  $\hat{R} - (\hat{T} + \hat{W} + \hat{Y})$  is the dollar amount of surplus of the grand coalition, which we can denote by  $\hat{\pi}$ , so the surplus of a cohort that produces  $R$  dollars of revenue is equal to  $\hat{\pi}$  discounted by  $\frac{R}{\hat{R}} < 1$ . This can be written as

$$R(S, L) \times \frac{\hat{\pi}}{\hat{R}}$$

where  $\frac{\hat{\pi}}{\hat{R}}$  is a constant given by the initial choices of grand cohort costs and revenue.

#### F. Shapley values

- (187) The Shapley values of each player are given by the average of that player's marginal contributions to surplus over all of the different arrival orderings. Our assumption that each label is equivalent to each other label, and each service is equivalent to each other service indicates that the Shapley value of each label will be equal, and the Shapley value of each service will be equal.
- (188) The marginal contribution of a player in a given arrival order is just the difference between the total cohort surplus once that player has arrived and the cohort surplus before the new arrival. That is, if cohort surplus before the new arrival is  $R_0 \times \frac{\hat{\pi}}{\hat{R}}$ , and cohort surplus after the new arrival is  $R_1 \times \frac{\hat{\pi}}{\hat{R}}$ , then the contribution of that player to that cohort is just  $(R_1 - R_0) \times \frac{\hat{\pi}}{\hat{R}} \geq 0$ .

#### G. Displaced or parallel revenue

- (189) The model also allows for the services to earn additional money in parallel to interactive streaming, in a way that relies upon streaming but that is not included in the revenue sharing pool. For example, a service might make use of its set of interactive music streaming subscribers to sell them access to podcasts, or any other parallel product, that it could not do if it were not for the music streaming service generating subscribers. This option is brought into the model by an addition to total surplus of  $q\hat{R}$ , which is money that is earned and retained by the services. If there is no displaced revenue at all, then  $q = 0$ . Otherwise, setting  $q > 0$  captures this parallel income element in the model, as revenue that is retained by the services. Parallel income is to be understood as net revenue. That is, it is the revenue earned in related business lines, less the costs



incurred in earning that revenue. For example, if the parallel gross revenue is, say, 80% of regular streaming revenue, then the gross parallel revenue is  $0.8R$ . If that revenue implies costs in the parallel business line of, say, 30 cents on the dollar, then the amount of parallel income (or net revenue) that should be brought into the Shapley model is  $(0.8 - 0.3)R = 0.5R$ , that is, in this example,  $q = 0.5$ .

#### H. Shapley sharing rule

- (190) The Shapley value for each player type will be the same among multiple players of that type, if there are any. But the Shapley values for different player types may be different.
- (191) The Shapley values are dollar amounts that sum to the total dollar value of surplus of the grand cohort (i.e. the total surplus when all players are present). That is, the Shapley model will return values  $V_P, V_L$  and  $V_S$  (the Shapley values for the publisher, each label, and each service respectively) such that

$$V_P + \hat{L}V_L + \hat{S}V_S = \hat{R} - \hat{T} - \hat{W} - \hat{Y} + q\hat{R}$$

- (192) Say that the model returns a Shapley value for the publisher of  $V_P$ . Then, the total payoff that should be retained by the publisher is its Shapley value. Denote by  $X_P$  the revenue that is paid to the publisher as streaming royalties. Then to satisfy the requirement that the publisher receives their Shapley value, we require  $X_P - \hat{Y} = V_P$ . That is,  $X_P = V_P + \hat{Y}$ .
- (193) Likewise, if  $V_L$  is the Shapley value of an individual label, the royalty payment from streaming revenue that achieves this is the number  $X_L$  that satisfies  $X_L = V_L + \frac{\hat{W}}{\hat{L}}$ . Combined, the set of all labels receives a share of streaming revenue equal to  $\hat{L}X_L = \hat{L}V_L + \hat{W}$ .
- (194) Finally, if the Shapley value of an individual service is  $V_S$ , then the share of revenue that is required to achieve this is the number  $X_S$  that satisfies  $X_S = V_S + \frac{\hat{T}}{\hat{S}} - \frac{q\hat{R}}{\hat{S}}$ . Combined, the set of all services receives a share of streaming revenue equal to  $\hat{S}X_S = \hat{S}V_S + \hat{T} - q\hat{R}$ .

(195) It might help to set down an example. In the example, it is assumed that there are 4 labels, 4 services and 1 publisher. To start with, take the case in which  $q = 0$ , so that the services' parallel income is not taken into account. Then, assume the following dollar values:  $\hat{R} = 1,000$ ,  $\hat{T} = 200$ ,  $\hat{W} = 300$ ,  $\hat{Y} = 100$ . With those numbers, the total surplus of the grand cohort is  $\hat{\pi} = 1000 - (200 + 300 + 100) = 400$ . The Shapley values divide this total surplus among the participants, so assume the Shapley values turn out to be  $V_P = 110$ ,  $4V_S = 80$ , and  $4V_L = 210$ . The total payoff that the publisher receives is  $X_P - 100$ , and this must be set equal to their Shapley value. Thus, we get  $X_P - 100 = 110$ , from which  $X_P = 210$ , or 21% of the grand cohort revenue. Second, the 4 services combined receive a payoff equal to  $4X_S - 200$ , which is set equal to their combined Shapley value, so that  $4X_S - 200 = 80$ , or  $4X_S = 280$ , that is, 28% of the grand cohort revenue. Finally, the four labels combined receive a payoff equal to  $4X_L - 300$ , which when set equal to their combined Shapley value gives  $4X_L - 300 = 210$ , or  $4X_L = 510$ , or 51% of the grand cohort revenue. Notice that the combined shares of revenue, namely 21%, 28% and 51% add up to 100%, reflecting that all of the streaming revenue is shared among the players, and all players have received a total payoff equal to their Shapley value (so all total surplus is shared among the players).

(196) Second, assume that  $q = 0.2$  so that the services now earn some income in parallel with streaming. In this case, total surplus of the grand cohort is now  $\hat{\pi} = 1000 - (200 + 300 + 100) + 200 = 600$ , and this is what the Shapley values will share. So, assume now that the Shapley values are<sup>79</sup>  $V_P = 140$ ,  $4V_S = 125$ ,  $4V_L = 335$ . In order to get their Shapley value, the set of 4 services needs to get a streaming payoff equal to  $4X_S = 4V_S + \hat{T} - q\hat{R} = 125 + 200 - 200 = 125$ , or 12.5% of the total shareable revenue of the grand cohort (which is still \$1,000). In order for the publisher to get their Shapley payoff of 140, they need to get a share of revenue of  $X_P = V_P + \hat{Y} = 140 + 100 = 240$ , that is, 24% of the total shareable grand cohort revenue. Finally, in order for the set of 4 labels to receive their combined Shapley value, they require a combined share of streaming revenue that is equal to  $4X_L = 4V_L + \hat{W} = 335 + 300 = 635$ ,

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<sup>79</sup> The Shapley values of all players is assumed to increase relative to the previous example. This is because all players are required to generate streaming service revenue, so all players have some hand in the creation of the parallel income that is retained by the services.

which is 63.5% of the total shareable grand cohort revenue. Again, the sum of the combined claims on revenue, namely 12.5%, 24% and 63.5% add up to 100%, so all of the grand cohort shareable revenue (\$1,000) is shared among the players, and all players have received a total payoff equal to their Shapley value (so all total surplus is shared among the players). Notice in this example how the addition of external, unshared, income for the services reduces their Shapley share of revenue, while it increases the share for the publisher and the labels. This is because the publisher and labels contribute to creating income that exists but that is not available to be shared with them directly, so instead the model compensates them with a larger portion of what can be shared with them. If the unshared parallel income is high enough, the model can dictate that the services (who get to keep the unshared income) should receive a negative share of the shareable income, which would be equivalent to the service agreeing to give the labels and publisher a share of the large pool of displaced profits that it is earning from the music product.

(197) In short, the general idea is the following:

1. The Shapley model calculates the Shapley values of all players, as their average contribution to creation of overall surplus (streaming surplus plus any parallel income earned by the services).
2. The sum of the Shapley values will equal the total overall surplus (revenue less costs) that is created by the grand cohort (the cohort in which all players are present).
3. In the grand cohort, each player's payoff is equal to a given share of (shareable) streaming revenue less their associated streaming costs, and for services, plus any parallel revenue that they earn.
4. Each player's payoff must end up being equal to their Shapley value. This is achieved by allocating to each player a share of revenue that is equal to their Shapley value plus reimbursement of their associated streaming costs and, for the services, less any parallel income that they earn.

I now turn to an explanation of the multiple publisher Shapley model.

## I. Multiple music publishers

- (198) The multiple music publisher model builds directly upon the previous one, although with new assumptions that make the calculations tractable. It can be thought of as an augmented version of the previous (single publisher) model, in that the single publisher model is simply a special case of the augmented (multiple publisher) model explained here.
- (199) The model with multiple publishers is my preferred construction, since it is better able to capture the true situation of interactive streaming, which does contain multiple of each type of player. The reality of the music streaming industry is that services license the musical repertoires of the different labels in agreements that cover only the repertoire, or catalogue, of each label independently. However, in order to actually include that repertoire on their service, the streaming company must also secure the musical works license to the same works. But the musical works licenses are not to be found with the same company that licenses the sound recording copyright, but rather it will be necessary to close deals with many different publishers. That is, there is no single supplier of the musical works license for the repertoire of any given label. In short, to operate a service even with only the repertoire of one label will involve licensing musical works from the entire set of publishers, and so it is logical to include multiple publishers in the model.
- (200) When there are more than one of a given player type, the Shapley model will deliver a Shapley value, and a corresponding revenue sharing rate for each player individually. In order that each publisher receives the same Shapley share of streaming revenue (since the Judges must set a single mechanical license, not several), the logical assumption to make is that all publishers in the model are the same in terms of their contributions to revenue and to costs (just as has been done for the labels and the services). That way, each will receive the same Shapley value, and the same share of streaming revenue. A single percentage rate for the total set of publishers (which is what the Judges should put in place) will then establish a total amount of money that the publishers will all share equally.

- (201) In the single publisher model, the total streaming market revenue that is available when there are  $L$  labels present in a cohort (out of a maximum number of labels of  $\hat{L}$ ), and there are  $S$  services (out of a maximum of  $\hat{S}$ ) is given by:

$$R(S, L) = \frac{L^\alpha S^\beta}{\hat{L}^\alpha \hat{S}^\beta} \times \hat{R}$$

if the (single) publisher is present, and by 0 if the publisher is not present. Recall that this formulation implies that if all of the labels and services, and the publisher, are present, then total (normalised) revenue is equal to the revenue generated by the grand coalition,  $\hat{R}$ .

- (202) Now, assume that instead of only one publisher, there are  $\hat{P}$  of them. Denote by  $P$  the number of publishers that are present in a given cohort, where of course  $P \leq \hat{P}$ . Assume that each publisher controls an equal share of the catalogue of each label, that is, each publisher can license a fraction  $\frac{1}{\hat{P}}$  of the catalogue of each label. So, for example, if a service has a license from only one label, and only one publisher, then that service will only have a license for, and will only be able to stream, a fraction  $\frac{1}{\hat{P}}$  of the music in the catalogue of the label in question. I continue to assume that this fractional catalogue is still substitutable (in terms of earning revenue) at the rate  $\alpha$  for an equally sized fractional catalogue of any other label (or indeed for an equally sized but different fractional catalogue of the same label).

- (203) In short, these assumptions imply that the streaming revenue that is earned by a cohort containing  $P$  publishers,  $S$  services and  $L$  labels is given by:

$$R(P, S, L) = \frac{\left(\frac{P}{\hat{P}} \times L\right)^\alpha \times S^\beta}{\hat{L}^\alpha \hat{S}^\beta} \times \hat{R} = \frac{(PL)^\alpha \times S^\beta}{(\hat{P}\hat{L})^\alpha \hat{S}^\beta} \times \hat{R}$$

- (204) Notice that if all of the publishers are present, then this is exactly the same expression as used in the previous version of the model, and if none of the publishers are present, then revenue is 0 (as in the previous version). Clearly, the special case of there being only one publisher available ( $\hat{P} = 1$ ), can easily be seen to deliver exactly the same model and payoffs as the previous version. Finally, it is also apparent from the revenue expression, that the multiple publisher model

essentially puts publishers and labels into equivalent situations in terms of their relative contribution to streaming revenue. Therefore, unless there are large differences in the costs that each of the labels and each of the publishers can recover, then the model will give the same Shapley payoff for each label and each publisher.

#### J. The issue of “must have” music

- (205) Adding the option of multiple music publishers to the model adds an additional dimension to the “must have” question. This is because when there are multiple publishers, and each publisher controls an equal fraction of the catalogue of each label, then it becomes clear that the “must have” concept really relates to musical catalogues rather than to labels themselves. With a single publisher, the musical catalogue of each label is available whenever that label is available, but with multiple publishers that is no longer the case. If we are to continue with the idea that each label’s entire catalogue is a “must have” (which we captured by  $k = 1$  in the previous version of the model), then we also need to recognise that every publisher is also a “must have” player.
- (206) On the other hand, if we go with the more sophisticated model where what is a “must have” is the catalogue of each *available* label that is controlled by each *available* publisher, then the model will deliver cohorts with positive revenue even with the minimal amount of repertory actually available (i.e. less than all of the catalogue of a single label). This also makes it even more unrealistic to assume that musical catalogues, as captured by partial fractions of the total catalogues of the labels, could really ever be thought of as perfect substitutes ( $\alpha = 0$ ), or even close to it. Making that assumption would imply that the same total revenue would be earned by a cohort with a fraction of the catalogue of only one label, as a cohort with all of the catalogues of all of the labels. In short, the multiple publisher model drives us even more towards a model in which the base units of music (fractional catalogues) are highly non-substitutable.
- (207) Aside from that issue, not much else changes in the model with multiple publishers. In particular, the issue of costs would be handled in exactly the same manner as above with the labels and with the services.

## K. Calculating estimated costs

### 1. Musical works industry costs

- (208) In order to calculate publisher costs, I took the 2019 cost figures from the witness statements of Thomas Kelly, JW Beekman and Annette Yocum, respectively.<sup>80</sup> After adding the actual costs figures together, I estimate industry costs by trueing these costs up to the market using the market share of these publishers. This estimate thus assumes that the rest of the market incurs costs at the same rate as these publishers. I expect this estimate to be conservatively low, for the same reason that the estimate of Service costs is conservatively high, because these are the costs of the three largest music publishers, which surely have economies of scale such that the rest of the market has higher costs relative to their size and output (which is the opposite of Spotify and the streaming industry, where the majority of that market is much larger than Spotify, and would incur fewer costs per output).
- (209) The market share calculation of these three publishers is based on a report from the MLC that provides precise data for calculating U.S. interactive streaming market share.<sup>81</sup> To calculate market share, unmatched and unclaimed royalties are subtracted from total royalties, and publisher shares are divided into that subtotal. This estimates that currently unmatched works will match to publishers along same market share lines.<sup>82</sup>
- (210) The market share of the three publishers works out to be almost exactly 50% -- 49.96% to be precise. Industry costs therefore work out to be:

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<sup>80</sup> See Written Direct Testimony of Thomas Kelly, *Phonorecords IV*, 21-CRB-0001-PR (2023-2027) (“Kelly WDT”), at ¶ 83; Written Direct Testimony of JW Beekman, *Phonorecords IV*, 21-CRB-0001-PR (2023-2027) (“Beekman WDT”), at ¶ 77; Yocum WDT, ¶ 63.

<sup>81</sup> COEX-9.18 (MLC\_CRB\_PHONO3\_00000334).

<sup>82</sup> This seems a particularly reasonable assumption since the law provides that works that cannot be matched are ultimately distributed on a market share basis. 17 USC § 1115(d)(3)(J)).

**Table 10**  
**Musical works industry cost estimates**

<i>(in million USD, rounded)</i>	SMP <sup>(1)</sup>	UMPG <sup>(2)</sup>	WCM <sup>(3)</sup>	Combined 3	Industry <sup>(4)</sup>
Songwriter Royalties	■	■	■	■	■
Overhead (incl A&R)	■	■	■	■	■
Marketing		■		■	■
Songwriter Royalties Lowered (50%)	■	■	■	■	■
Songwriter Royalties Raised (50%)	■	■	■	■	■

*Sources: (1) Kelly WDT, ¶¶ 81-83; (2) Beekman WDT, ¶¶ 75-77; (3) Yocum WDT, ¶¶ 61-63; (4) COEX-9.18*

## 2. Sound recording industry costs

(211) As discussed in my report, in order to estimate applicable sound recording industry costs, Warner Music Group Corp.'s (WMG) filings with the U.S. Securities and Exchange Commission are used.<sup>83</sup> WMG's cost categories are then calculated as a percentage of its revenue. Since WMG operates on a March fiscal year, WMG's fiscal year numbers in its 10-K are adjusted by reference to its Q4 numbers in its 10-Q to get calendar year 2019 numbers:

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<sup>83</sup> See COEX-9.19 (Warner Music Group Corp., Annual Report (Form 10-K) (for the fiscal year ended September 30, 2019), <https://investors.wmg.com/static-files/8d2ace45-56b5-45a8-b194-716c5040a7dc>); COEX-9.20 (Warner Music Group Corp., Quarterly Report (Form 10-Q) (for the quarterly period ended December 31, 2019), <https://investors.wmg.com/static-files/329cf276-f1ae-438e-b067-ebcfacceb98>).



**Table 11**  
**Sound recording industry cost estimates**

<i>(in million USD)</i>	FY 2019 (ended Sep. 2019)	Q4 2019 (ended Dec. 2019)	Q4 2018 (ended Dec. 2018)	CY 2019	Cost as % of Revenues
WMG Recorded Music Revenues	3,840 <sup>(1)</sup>	1,084 <sup>(4)</sup>	1,041 <sup>(4)</sup>	3,883	
WMG Recorded Music Costs <sup>84</sup>					
A&R and Artist Payments	1,178 <sup>(2)</sup>	294 <sup>(5)</sup>	295 <sup>(5)</sup>	1,177	30.31%
General & Administrative	477 <sup>(3)</sup>	92 <sup>(5)</sup>	116 <sup>(5)</sup>	453	11.67%
Sales & Marketing <sup>85</sup>	621 <sup>(3)</sup>	169 <sup>(5)</sup>	157 <sup>(5)</sup>	633	16.30%

Sources: (1) COEX-9.19 at 36; (2) COEX-9.19 at 45; (3) COEX-9.19 at 46; (4) COEX-9.20 at 38; (5) COEX-9.20 at 43

- (212) Those cost fractions are then applied to the actual sound recording industry revenues from U.S. interactive streaming, as reflected in the TCC figures reported by the Services for 2019, which I understand to be defined to capture all consideration provided to record companies for interactive streaming.<sup>86</sup> Dr. Eisenach helpfully provides these numbers in his report, based upon a review

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<sup>84</sup> WMG describes its cost categories as follows:

“A&R costs: the costs associated with (i) paying royalties to recording artists, producers, songwriters, other copyright holders and trade unions; (ii) signing and developing recording artists; and (iii) creating master recordings in the studio;

Product costs: the costs to manufacture, package and distribute products to wholesale and retail distribution outlets, the royalty costs associated with distributing products of independent labels to wholesale and retail distribution outlets, as well as the costs related to our artist services business;

Selling and marketing expenses: the costs associated with the promotion and marketing of recording artists and music, including costs to produce music videos for promotional purposes and artist tour support; and

General and administrative expenses: the costs associated with general overhead and other administrative expenses.”

I do not include Product Costs in the model, as these appear related exclusively to products outside the interactive streaming space.

<sup>85</sup> Sales & Marketing costs are included only in my sensitivity analysis in Appendix D, in order to show sensitivity to inputs. For the reasons discussed in my report, I do not believe they should be included in the Shapley model and they are not included in my base model.

<sup>86</sup> This approach is similar to the approach taken by Prof. Marx in *Phonorecords III*, except my method avoids her step of allocating global costs to U.S. costs by revenue, and then estimating WMG’s U.S. market share in order to raise WMG’s costs to the U.S. industry level. Instead, WMG is trued up to the industry by applying the WMG cost percentages to actual industry revenues, which removes one estimation point and should therefore provide a more accurate industry estimate.

of the certified royalty statements of the Services.<sup>87</sup> In addition to the two cost categories from the WMG filing that are most appropriate, I include alternative cost categories that I use in alternate models as a sensitivity analysis: Sales & Marketing and two alternate calculations of the “A&R and Artist Payments” category, to adjust estimates on artist costs. In one of these alternate calculations, the cost category is reduced by 50%, which would correspond to the average artist making a significant profit off of their work. In the other, the cost category is raised by 50%, which would correspond to the average artist expending more costs and labour than they receive back in royalties.

**Table 12**  
**Sound recording industry cost estimates**

2019 record company interactive streaming revenues ( <i>in million USD</i> )		Estimated 2019 industry cost categories for interactive streaming
A&R and Artist Payments		
General & Administrative		
Sales & Marketing <sup>2</sup>		
A&R/Artist Payment Lowered (50%)		
A&R/Artist Payment Raised (50%)		

Source: (1) Eisenach WDT, Appendix C, ¶ 1, fn.1.

### 3. Streaming service industry costs

- (213) As discussed in my report, to estimate streaming service industry costs, Spotify’s U.S. financials as produced in this proceeding were used.<sup>88</sup> Spotify’s cost categories are calculated as a percentage of its revenue. Those cost fractions are then applied to the actual streaming service industry revenues from U.S. interactive streaming, as reflected in the Service Provider Revenue figures reported by services for 2019:

<sup>87</sup> Written Direct Testimony of Jeffrey Eisenach, *Phonorecords IV*, 21-CRB-0001-PR (2023-2027) (“Eisenach WDT”), Appendix C.

<sup>88</sup> See COEX-9.21 (SPOT\_P4\_000002098).

**Table 13**  
**Streaming service industry cost estimates**

<i>(in million USD, rounded)</i>	Spotify	Costs as % of Revenue	Industry
Revenues			
Non-content Cost of Revenues			
Research & Development			
General & Administrative			
Sales & Marketing			

*Sources: (1) COEX-9.21 at P8; (2) COEX-9.21 at P32; (3) COEX-9.21 at P39; (4) COEX-9.21 at P40; (5) COEX-9.21 at P38; (6) Eisenach WDT, Appendix C, ¶ 1, fn.1.*

## Appendix D: Alternative market configuration results

- (214) In the main report, my Shapley results corresponded to (i) a set of 4 different market configurations regarding the numbers of player types, (ii) industry costs for each player type that exclude marketing costs and that have creator costs at 100% of royalties, and (ii) substitutability parameters of  $\alpha = 0.9$  and  $\beta = 0.1$ . These different modelling assumptions reviewed in the main report provide my core modelling results as well as a sensitivity analysis around the player inputs, the revenue inputs and the input concerning the “must have” nature of content.
- (215) Here I provide additional sensitivity analysis around the other model inputs, namely costs and necessity/substitutability. With these results, the Judges have a broad sensitivity analysis concerning *every* input to the Shapley model. This sensitivity analysis is accomplished by recalculating the results using alternative parameter values for costs and necessity/substitutability. Specifically, I test a range of substitutability parameter values, and I include (first) marketing costs, and (second) I change the creator costs either downwards by 50% or upwards by 50%. In all of the models I only consider the appropriate “must have” assumption ( $k = 0$ ), I only consider an intermediate case of displaced revenue ( $q = 0.1$ ), and I only consider the most appropriate player model (3 music publishers, 3 record companies, and 3 services). Nonetheless, the sensitivity demonstrated here should be relatively consistent across other base modelling choices, and therefore the insights here can be extrapolated to the other configurations in the main report.
- (216) In terms of the substitutability parameters, starting with the baseline settings of  $\alpha = 0.9$  and  $\beta = 0.1$  (which I repeat in this sensitivity analysis for ease of comparison), I now add in settings of, first,  $\alpha = 0.8$  and  $\beta = 0.2$ , and second,  $\alpha = 0.7$  and  $\beta = 0.3$ . These changes downgrade the “necessity” of music (labels, and when there are more than one, publishers as well), and upgrade the “necessity” of the services.
- (217) In terms of the different cost scenarios that I now consider, they are captured in the following table, which is calculated directly from my cost analysis.

**Table 14**  
**Ranges of cost assumptions for sensitivity analysis**

	Cost assumption			
	S&M excluded, creator costs at 100%	S&M included, creator costs at 100%	S&M excluded, creator costs at 50%	S&M included, creator costs at 150%
<b>Musical works</b>				
<b>Sound recording</b>				
<b>Streaming</b>				

(218) In all of the sensitivity analysis cases, total interactive streaming revenue of the grand cohort is held at  $\hat{R}$  7,455,551.211. All of the revenue share numbers are percentages.

**Table 15**  
**Shapley percentage revenue sharing with  $\alpha = 0.9$  and  $\beta = 0.1$**   
**across range of cost assumptions**

	Cost assumption			
<b>Revenue shares</b>	S&M excluded, creator costs at 100%	S&M included, creator costs at 100%	S&M excluded, creator costs at 50%	S&M included, creator costs at 150%
<b>Musical works</b>	37.3	29.3	38.0	28.7
<b>Sound recording</b>	49.1	50.0	46.5	52.5
<b>Streaming</b>	13.6	20.7	15.5	18.8

**Table 16**

**Shapley percentage revenue sharing with  $\alpha = 0.8$  and  $\beta = 0.2$   
across range of cost assumptions**

	<b>Cost assumption</b>			
<b>Revenue shares</b>	<b>S&amp;M excluded, creator costs at 100%</b>	<b>S&amp;M included, creator costs at 100%</b>	<b>S&amp;M excluded, creator costs at 50%</b>	<b>S&amp;M included, creator costs at 150%</b>
<b>Musical works</b>	36.0	28.4	36.3	28.0
<b>Sound recording</b>	47.7	49.0	44.8	51.9
<b>Streaming</b>	16.3	22.6	18.9	20.1

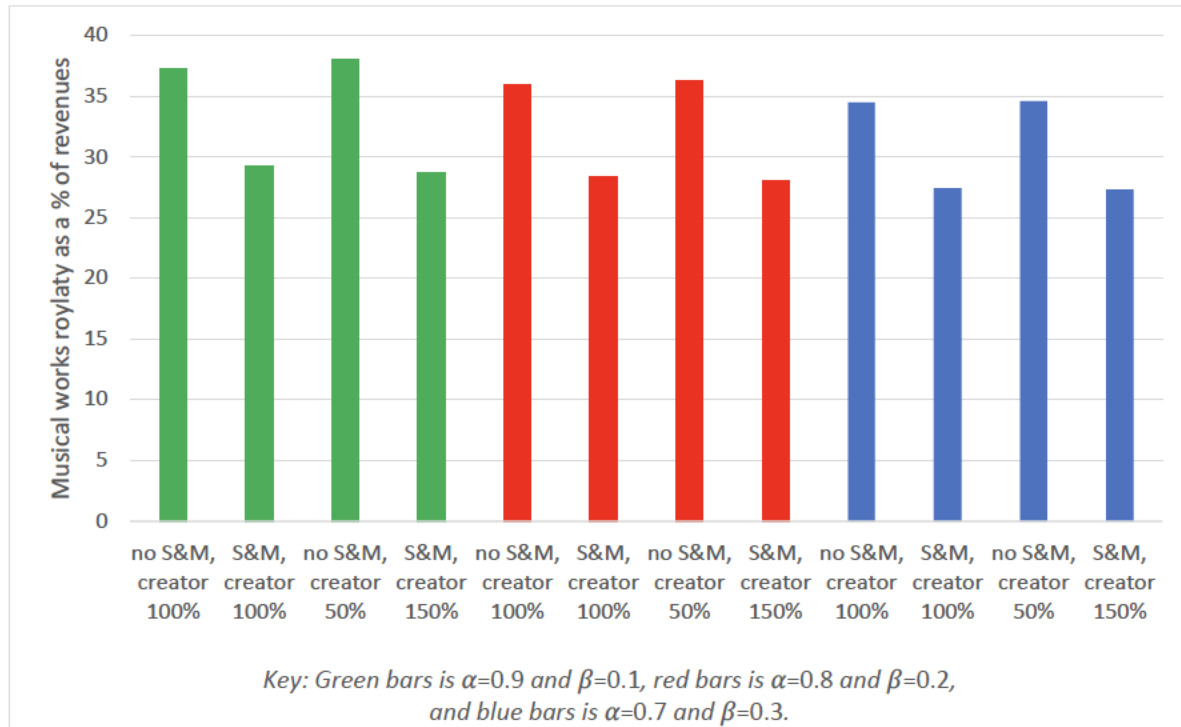
**Table 17**

**Shapley percentage revenue sharing with  $\alpha = 0.7$  and  $\beta = 0.3$   
across range of cost assumptions**

	<b>Cost assumption</b>			
<b>Revenue shares</b>	<b>S&amp;M excluded, creator costs at 100%</b>	<b>S&amp;M included, creator costs at 100%</b>	<b>S&amp;M excluded, creator costs at 50%</b>	<b>S&amp;M included, creator costs at 150%</b>
<b>Musical works</b>	34.5	27.4	34.6	27.3
<b>Sound recording</b>	46.3	48.0	43.1	51.2
<b>Streaming</b>	19.2	24.6	22.3	21.4

Chart 7

**Summary of musical works Shapley revenue share  
under all sensitivity analysis scenarios considered**



(219) The specific take-aways from my sensitivity analysis are the following:

- a. In every single case studied, the Shapley revenue sharing rate for musical works vastly exceeds the status quo.
- b. The inclusion of sales and marketing costs depresses the Shapley sharing rule for musical works by around 7 percentage points in all cases.
- c. A broad range of assumptions, based around current royalty income, concerning the amount of creator costs that are included in the analysis has little final impact on the Shapley sharing rule for musical works.
- d. Changing the substitutability parameters such that music is downgraded in terms of necessity, and the services are upgraded in terms of necessity, makes a difference of between 1 and 2 percentage points to the Shapley sharing rule for musical works.

D-4

- (220) The general take-away from the baseline model and all of the alternative models and sensitivity analyses is that the Shapley analysis results corroborate that (1) the musical works royalty rate should increase and (2) the proper ratio to use in adjusting benchmark interactive streaming sound recording royalty rates is well below 2.5:1, and that this result is robust to significant variations in all of the model inputs.



## Appendix E: Nash bargaining analysis: The see-saw effect in bargaining and services' parallel income

- (221) In past proceedings on the issue of setting the regulated rate for musical works copyright licensing, much has been made of the “see-saw” effect – the idea that an increase in the statutory rate for musical works will not have an undue effect upon the economic situation of services, since if the record companies have been capturing a large portion of the surplus in their negotiations with the services, then much of the increase will be counter-acted by a decrease in the bargained rate for licensing of the sound recording copyright. Since the labels do indeed bargain with services for their licensing rate, and they do that with knowledge of the statutory rate that has been set, the see-saw effect is persuasive and it will exist. However, it is worth analysing particularly how this dynamic is affected by parallel (or displaced) income earned by the services due to the operation of interactive streaming, but that was not included in the revenue sharing pool. As it happens, this parallel income is fundamental in considering the see-saw, and indeed in considering the relevant level of the statutory rate.
- (222) In order to analyse this situation, it is easiest to simply assume the simplest possible general bargaining game between labels and services, that is, only one “combined” label player, and only one “combined” service player. The statutory rate for musical works is set at a fraction of revenue equal to  $\theta$  and the label and service negotiate for the sound recording rate  $\delta$ , also a fraction of revenue. However, while the level of revenue observed in the streaming market is  $R$ , *deriving from and relying upon the operation of the streaming service*, a further sum of money, say  $Q$  is earned by the service outside of the streaming market.<sup>89</sup> The label and publishers can only share  $R$ , rather than directly sharing  $R + Q$ .
- (223) The Nash bargaining solution then is the value  $\delta^*$  that maximizes the “Nash product,” that is, it solves:

$$\max_{\delta}(Q + R - tR - \theta R - \delta R)^{1-\mu}(\delta R(1 - r))^{\mu}$$

---

<sup>89</sup>  $Q$  is net of its associated costs incurred in the business line in which it accrues. It is therefore income, or “net revenue”.

where  $tR$  represents the services' non-content costs,  $\delta Rr$  are the labels' non-content costs, and  $\mu$  is the “relative bargaining power” of the labels.

- (224) It is convenient to set  $Q = qR$ , where  $q \geq 0$ , but it is a value that is *not* restricted to be less than 1. Using this, the bargaining problem is to find the value  $\delta$  that maximises the Nash product. Before carrying out that operation, it is worthwhile to simplify the expression for the Nash product, by noticing that the actual value of revenue  $R$  is irrelevant to the maximization problem:

$$(qR + R - tR - \theta R - \delta R)^{1-\mu} (\delta R(1-r))^\mu = R^{1-\mu} (q + 1 - t - \theta - \delta)^{1-\mu} R^\mu (\delta(1-r))^\mu$$

- (225) But this is just:

$$R(q + 1 - t - \theta - \delta)^{1-\mu} (\delta(1-r))^\mu$$

- (226) And so the value of revenue,  $R$ , is irrelevant for the maximization process, since given a number for  $R$ , whatever value of  $\delta$  maximises  $(q + 1 - t - \theta - \delta)^{1-\mu} (\delta(1-r))^\mu$  will also maximise the Nash product. We are therefore left with the following problem:

$$\max_{\delta} (q + 1 - t - \theta - \delta)^{1-\mu} (\delta(1-r))^\mu$$

- (227) This problem is concave in  $\delta$ , so the solution satisfies the first-order condition:

$$\begin{aligned} &-(1-\mu)(q + 1 - t - \theta - \delta^*)^{-\mu} (\delta^*(1-r))^\mu \\ &+ (q + 1 - t - \theta - \delta^*)^{1-\mu} \mu (\delta^*(1-r))^{\mu-1} (1-r) = 0 \end{aligned}$$

- (228) Taking a common factor of  $(q + 1 - t - \theta - \delta^*)^{-\mu} (\delta^*(1-r))^\mu > 0$ , the first-order condition becomes:

$$\begin{aligned} &(q + 1 - t - \theta - \delta^*)^{-\mu} (\delta^*(1-r))^\mu \left( -(1-\mu) \right. \\ &\quad \left. + (q + 1 - t - \theta - \delta^*) \mu (\delta^*(1-r))^{-1} (1-r) \right) = 0 \end{aligned}$$

- (229) Therefore, the term in the parentheses must be 0:

$$(1-\mu) = (q + 1 - t - \theta - \delta^*) \mu (\delta^*(1-r))^{-1} (1-r)$$

Notice that the term  $(1-r)$  cancels, leaving us with

$$(1-\mu) = (q + 1 - t - \theta - \delta^*) \mu (\delta^*)^{-1}$$

This then easily solves out to give the Nash bargaining solution as follows:

$$\begin{aligned}\delta^* &= \frac{\mu}{(1-\mu)}(q+1-t-\theta-\delta^*) = \frac{\mu}{(1-\mu)}(q+1-t-\theta) - \frac{\mu}{(1-\mu)}\delta^* \\ \delta^* + \frac{\mu}{(1-\mu)}\delta^* &= \frac{\mu}{(1-\mu)}(q+1-t-\theta) \\ \delta^* \left( \frac{1}{(1-\mu)} \right) &= \frac{\mu}{(1-\mu)}(q+1-t-\theta) \\ \delta^* &= \mu(q+1-t-\theta)\end{aligned}$$

- (230) So, the negotiated sound recording royalty will be a fraction  $\mu(q+1-t-\theta)$  of  $R$ , the part of total revenue that is shared with the copyright holders.
- (231) We can immediately see that the see-saw still holds; a marginal increase in the statutory rate  $\theta$  decreases the bargained sound recording rate by an amount equal to the labels' bargaining power parameter,  $\mu$ . However, we now have the result that the bargained rate also depends critically upon the degree to which the services earn parallel income from the operation of interactive streaming. Specifically, a marginal increase in  $q$  increases the label's share of revenue by an amount equal to their bargaining power parameter,  $\mu$ .
- (232) To get an idea of how this works out, assume that  $t = 0.25$ , and that  $\theta = 0.15$ . Then, the sound recording royalty is  $\delta^* = \mu(q + 0.6)$ . If, for example, we see that the negotiated royalty is 0.55, then we can calculate that  $0.55 = \mu(q + 0.6)$ , or  $\mu = \frac{0.55}{q+0.6}$ . That is, there is a negative relationship between the labels' bargaining power and the amount of the services' parallel net revenue. The higher is the parallel net revenue, the lower is the bargaining power value for any given observed bargained outcome. If there is no parallel net revenue, so that  $q = 0$ , then an observed negotiated rate of 0.55 implies that the labels' bargaining power must have been  $\frac{0.55}{0.6} = 0.917$ . However, for example, if  $q = 1$  (the amount of parallel net revenue is equal to the amount of observed streaming revenue), then a negotiated royalty of 0.55 is consistent with the label having bargaining power of only about 0.34. And if the displaced net revenue is twice as large as the observed streaming revenue, i.e. if  $q = 2$ , then observing a negotiated rate of 0.55 implies a bargaining power of only a little over 0.21.

- (233) Notice that, if the amount of displaced net revenue is sufficiently high, then for a given bargaining power, the solution could give more than 100% of the available shareable revenue to the label. That would happen if  $\mu(q + 0.6) > 1$ , which is the same as  $q > \frac{1-0.6\mu}{\mu}$ . For example, if we were to assume that the label and the service have equal bargaining power, so that  $\mu = 0.5$ , then the solution would involve the services delivering more than 100% of the revenue observed in the streaming market,  $R$ , to the label, if  $q > \frac{1-0.6 \times 0.5}{0.5} = 1.4$ . That is, the parallel net revenue would have to be greater than 140% of the observed revenue. In this situation, say  $q = 1.4$ , then the service would pay 100% of  $R$  to the labels, along with 15% of  $R$  to license the musical works, and 25% of  $R$  for their own non-content costs. The total payment for streaming is thus 140% of  $R$ . But this is not an instance of the service losing money on the enterprise. On the contrary, the service, in this example, has 240% of  $R$  in total earned ( $R$  in the streaming market plus 140% of  $R$  in parallel net revenue), so the total amount of revenue perceived by the service is  $2.4R$ , of which  $1.4R$  is lost in streaming costs (content and non-content costs), leaving the service with a positive net position of  $\$R$ .
- (234) The importance of this analysis for the issue of the see-saw is that, given an observed negotiated sound recording rate, we need to understand that the bargaining power parameter that should be associated with that bargained outcome depends on the amount of parallel income that is involved. Assuming that parallel income is 0 is tantamount to assuming that the bargaining power parameter is arbitrarily high, and therefore so would be the see-saw effect. The higher is the amount of parallel income earned by the services, the lower is the bargaining power parameter (and therefore the see-saw effect) associated with the problem. If it is observed that an increase in the statutory rate leads to hardly any effect upon the bargained sound recording rate, this could be explained by an understanding that the level of parallel income earned by the services is rather high.
- (235) Notice also that, while the existence of parallel income has the effect of reducing the relative bargaining power parameter of the labels for any given observed bargained outcome, and thus it reduces the see-saw effect, it strengthens the case for rises in the statutory rate being acceptable and non-harmful for the interactive streaming business. Raising the statutory rate when there is

a large amount of parallel income in play, will have a minimal effect on the labels (since the see-saw effect is small), and it only increases the costs of the services for a part of their income (that part of revenue that is in fact shared), leaving the parallel income intact. In essence, this points to a rather obvious, but still very important point; the higher the level of parallel income of the services, the greater their ability to absorb increases in the statutory rate for musical works.

- (236) To see why this is important, the content costs of the services are equal to  $(\theta + \delta^*(\theta))R$ , where  $\delta^*(\theta)$  is the negotiated sound recording rate, given the statutory musical works rate of  $\theta$ . An increase of  $d\theta$  in the statutory rate increases the content costs of the services by an amount  $d\theta(1 + \delta'^*(\theta))R$ , where  $\delta'^*(\theta) < 0$  is the see-saw effect. But we have seen above that  $\delta'^*(\theta) = -\mu$ , so the effect of this increase in the statutory rate on the content costs of the services is  $d\theta(1 - \mu)R$ . The content costs of the service would increase by this amount, which would increase the overall costs of the service, expressed as a fraction of their total revenue, of:

$$\frac{d\theta(1 - \mu)R}{(1 + q)R} = \frac{d\theta(1 - \mu)}{1 + q}$$

- (237) Clearly, the larger  $q$  is the smaller the overall effect upon the economic situation of the service. For example, if  $d\theta = 0.05$ , that is, an increase of 5 percentage points in the statutory rate, and if we assume  $\mu = 0.5$  and  $q = 1$  (so that the service and label have equal bargaining power, and the service earns parallel net revenue equal in size to the declared streaming revenue), then the content costs of the service, relative to its total revenue from streaming, increases by only  $\frac{0.05(1-0.5)}{2} = 0.0125$ , or just over 1 percentage point.

Appendix F: *PHONORECORDS III*  
REMAND WRITTEN REBUTTAL TESTIMONY

Before the  
UNITED STATES COPYRIGHT ROYALTY JUDGES  
The Library of Congress

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In the Matter of )  
 )  
 )  
DETERMINATION OF RATES AND ) Docket No. 16-CRB-0003-PR (2018-22) (Remand)  
TERMS FOR MAKING AND )  
DISTRIBUTING PHONORECORDS )  
(PHONORECORDS III) )  
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REMAND WRITTEN REBUTTAL TESTIMONY OF RICHARD WATT (PHD)

(On behalf of the National Music Publishers' Association and  
the Nashville Songwriters Association International)

JULY 2, 2021

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## I. Scope of assignment

1. At the request of the Copyright Owners in this proceeding, the National Music Publishers' Association and the Nashville Songwriters Association International, I was asked to analyse the testimony submitted by the Services (Amazon, Google, Pandora and Spotify) in this remand proceeding, and address the claims and arguments made in that testimony regarding the Copyright Royalty Board's (the "Board") Final Determination published on February 5, 2019 ("Final Determination"), with particular emphasis on the claims made by the Services concerning the Board's references to bargaining theory in economics.

## II. Qualifications

2. I am currently Professor of Economics in the Department of Economics and Finance at the University of Canterbury (New Zealand). I am also the General Secretary, and Past President, of the Society for Economic Research on Copyright Issues. I serve as the Managing Editor of the Review of Economic Research on Copyright Issues. I hold a Ph.D. in economic theory from the Autonomous University of Madrid (Spain).

3. I was qualified as an expert witness in the field of applied microeconomics and the economics of copyright in this Phonorecords III proceeding before the Board, where I submitted written and testimonial rebuttal evidence.

4. I have published numerous peer-reviewed articles, and I have been involved in economic research on issues around copyright licensing for over 20 years. A copy of my curriculum vitae is annexed at Appendix A. In forming my opinions, I have relied upon the materials annexed at Appendix B.

## III. Summary of conclusions

5. The Services' testimony on this remand seems primarily focused on creating a "straw man" argument to attack. By this, I mean that the Services accuse the Board of something that the Board did not do—that is, rely on a guarantee of a particular decrease in

sound recording royalty rates—and the Services then attack the Board’s determination by claiming that the decrease did not occur. This argument is particularly deficient because [REDACTED]. But as my analysis below explains, the Board was correct in its economic thinking not simply because [REDACTED]. [REDACTED] corroborates the Board’s lucid reasoning that the Services were not facing any threat of disruption. However, the insights distilled by the Board from bargaining theory were sound independent of the specific movement of sound recording royalty rates, which are not regulated by the Board. The Services’ efforts to “dumb down” the Board’s insights on bargaining theory fails on both the theory and on the facts.

6. An overview of some of my primary conclusions is as follows:
  - (i) The bargaining theory insights discussed by the Board in the Final Determination do not underlie its determination of the proper rate *structure*, and in particular the question of the Board’s expanded use of a “true” TCC prong.<sup>1</sup> As the Board itself appropriately noted, the bargaining theory insights are applicable regardless of the rate structure at issue. With respect to determining the proper rate structure, the Board properly relied upon the need for rate prongs that could protect against existing business strategies that lead to revenue diminution by the streaming services. Fair divisions of surplus must be based upon the best approximations of actual expected surplus, not simply a subset of surplus that is captured by the present realization of a portion of the expected revenues generated. “True” TCC prongs have always been included in the U.S. compulsory mechanical rate structure for interactive streaming, and each of the Services propose the use of such “true” TCC prongs for most of their proposed offering types. The Services’ experts do not attempt an economic argument for why such a “true” TCC prong is appropriate for some offerings but unreasonable for others, and I do not see a persuasive economic argument to justify removing or crippling the effectiveness of these important alternative rates for some offerings.

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<sup>1</sup> By a “true” TCC prong, I refer to what has also been described as an “uncapped” TCC rate prong, that is, a royalty rate prong that is (a) based upon a percentage of consideration provided by a service to sound recording licensors and (b) not subject to nullification by a lower per-subscriber rate.

- (ii) The Board’s discussion of bargaining theory was suitably offered in connection with a narrow issue in its Final Determination, that is, to understand the impact of any “artificial” inflation of the sound recording royalty rate by virtue of the prior compulsory musical works royalty rate being then below a market rate. The simple insights distilled by the Board—that there is no economic basis to predict disruption based upon this effect and that “[b]argaining theory instructs that the services and the record companies will take into account any increase in the statutory royalties that the services must pay”—was accurate, and the analyses in the Services’ expert reports do not imply otherwise. (Final Determination at 74, fn 138) While the Nash bargaining model is theoretical in nature, it captures the essential features and attributes of a real-world bargaining situation, and the general principles that are derived from that model are entirely applicable.
- (iii) The bargaining insight that has come to be described as a “see-saw” reflects a simple expectation of symmetry in bargaining outcomes. In short, it says that the bargained division of surplus will hold as the surplus increases *or* decreases. This expectation of symmetry holds regardless of the particular division of surplus that the model assumes. In my original model, I assumed much of Dr. Marx’s data assumptions (although noting my deep reservations) which led to her model showing the record companies had very large bargaining power and took nearly all of the surplus in their bargains with streaming services. In such a case, bargaining theory certainly does predict that a reduction in surplus (such as through an increased musical works royalty rate) would be borne nearly entirely by the record companies. Drs. Marx’s and Katz’s new reports merely posit that perhaps the record companies did *not* have such large bargaining power and did *not* bargain for nearly all of the surplus in the first place. It is true that in such a case one would not expect to see the record companies bear nearly all of a decrease in surplus. But this assumption also means that *the record companies had not bargained for nearly all of the surplus in the first instance, but rather the streaming services had substantial bargaining power and were obtaining substantial surplus*. If such is the case, then the whole predicate for the Services’ alleged concerns about the TCC rate—that is, that the record companies are a complementary oligopoly that extracts nearly all of the surplus from the streaming services and threatens the streaming services’ viability—does not hold. In the end, regardless of the data assumptions, the conclusion is the same: *if* the way in which surplus is shared between labels and services is being affected by the compulsory musical works rate being too low, then whatever the effect is, big or small, that effect is expected to recede as the musical works rate rises towards the market rate.
- (iv) The particular prediction of the model in my original report was based on data and assumptions put forward by Dr. Marx, which implied that record companies were extracting nearly all of the surplus in their bargains with the streaming services. My original report noted serious concerns and doubts that I had with



Dr. Marx's data, including that the data likely did not properly reflect displaced and deferred service revenues. My bargaining model showed the expected dynamics with Dr. Marx's assumptions. However, the actual effects one would expect to see several years later would be based on the actual data at that time. Moreover, I would expect many other variables to have a larger effect on the bargains than the relatively small changes in the musical works rate. Changes to other streaming service costs due to economies of scale, along with changes in displaced and deferred revenues, would easily dwarf the changes in the musical works royalty rate, and understanding actual market outcomes requires understanding these variables.

- (v) The Board's insights from bargaining theory hold regardless of the assumptions made in a Nash bargaining model, but it must be noticed that the alternative bargaining models put forward by Drs. Katz and Marx are incorrectly designed. It is at odds with established bargaining theory (and basic economic theory) to include an "outside option" (also understood as an opportunity cost) as if it were a regular financial cost to be reimbursed out of surplus before bargaining over the remaining net surplus. Further, introducing such an outside option onto only one side of the bargaining process is overtly biased. Still, it bears repeating that the alternative models put forward by Drs. Katz and Marx do not undermine the validity of the Board's bargaining insights.
- (vi) Claims by the Services' experts that the Board's determination depends upon a guarantee of a dollar-for-dollar reduction in sound recording royalties as a percentage of revenue if the musical works rate were to rise as a percentage of revenue is simply illogical for numerous reasons. Chief among these reasons perhaps is that the Board specifically included alternative rate prongs to the revenue rate prong, in order to protect against the fact that Service Revenue as defined in the regulations is not a reliable indicator of surplus. The effect of these other rate prongs is precisely to increase the royalty rate as a percentage of revenue. To say that the Board was guaranteeing a total royalty rate *measured as a percentage of revenue* would be to say that the Board was rejecting the very alternative rate prongs that it found to be necessary (and which are truly quite important to maintaining fair royalties in a service marketplace characterized by revenue displacement and deferral strategies).
- (vii) The Services generally paid royalties at the *Phonorecords III* rates and terms for at least 33 monthly royalty periods (that is, for the periods from January 2018 through September 2020), before an appeal decision led the Services to revert to paying at *Phonorecords II* rates and terms. My review of an analysis by Dr. Eisenach of the history of royalty payments by the Services indicates that [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]. I find it very concerning

that this fact was not discussed by the experts for the Services, as it contradicts their claims and is consistent with the Board's reasoning.

- (viii) Dr. Katz is incorrect to assert that the Shapley methodology is unsuitable because it does not remove abuse of market power by an input supplier "holding out." By construction, the Shapley methodology *does* eliminate the "holdout" problem by any of the input suppliers. Indeed, this is a core and well-accepted feature of the Shapley methodology, and it is nothing short of strange for an experienced economist to assert otherwise.

#### IV. The Board correctly referenced bargaining theory insights in reasoning that the musical works rate would not disrupt the streaming market

##### A. The concern of the Board

7. In thinking about the existing royalty situation, and whether or not it can be improved upon in the sense of better fulfilling the Section 801(b) factors, it appears that the Board was led to wonder if the fact that the compulsory musical works royalty rate being set below market levels could lead to a rise in the negotiated sound recording royalty rate, and if so, whether raising the compulsory musical works royalty rate to a fair rate would then lead to disruption from a combined royalty rate that would end up being too high.

8. In considering these questions, the Board referenced the Nash bargaining model that was included within my rebuttal report (rebutting the direct written expert report of Dr. Marx), and that addressed economic insights on this issue. In particular, that model showed that, under Dr. Marx's assumptions, one explanation for a sound recording royalty rate that was higher than predicted is that the compulsory musical works royalty rate was set below what was predicted, and the sound recording licensors were able to extract nearly all of the surplus in their bargains with the services. In such a situation, raising the musical works royalty rate would be expected to have a limited effect upon the combined rate, since, as the musical works rate increases, the bargained sound recording rate would be expected to decrease.

9. It is notable to me that the Board raised this concern as separate from another concern that it had concerning potential record company market power. (Final Determination at 73) The Judges noted two concerns in setting the TCC percentage: (i) “the existence of complementary oligopoly conditions in the market for sound recordings” and (ii) “what Professor Watt describes as the record companies’ ability to obtain most of the available surplus due to the music publishers’ absence from the bargaining table.” (Id.)

10. As to the first concern, the Board concluded that, “the problem of, in essence, importing complementary oligopoly profits into the musical works rate through a TCC percentage can be avoided by reducing the TCC percentage.” (Id.) The Board ultimately applied a ■■■ percent reduction to arrive at its target TCC percentage, reducing it from ■■■ percent to ■■■ percent.<sup>2</sup> (Id. at 75)

11. On the second concern, the Board stated: “As to the issue of applying a TCC percentage to a sound recording royalty rate that is artificially high as a result of musical works rates being held artificially low through regulation, the Judges rely on Professor Watt’s insight (demonstrated by his bargaining model) that sound recording royalty rates in the unregulated market will decline in response to an increase in the compulsory license rate for musical works.” (Id. at 73-74)

12. The Board’s statement of its concern here strikes me as very salient, as the Board is correctly applying bargaining theory insights to the right question. The Board was not referencing bargaining theory as a solution for potential complementary oligopoly concerns. Rather, those concerns were addressed with the very large reduction in the TCC percentage itself.

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<sup>2</sup> Since the TCC rate was also phased in over five years, the effective discount was even greater. Factoring in the phased rates, the average TCC percentage adopted by the Board over the five-year rate period is only 24.1 percent, which is ■■■ percent lower than the TCC rate that the Board found indicated by the Shapley analyses.



13. The remaining concern about which the Board looked to bargaining theory is strictly about a sound recording rate that is “artificially high *as a result* of musical works rates being held artificially low through regulation.” (Id. at 73) This concern is addressed by Nash bargaining theory, which instructs that an “artificial inflation” due to a below market compulsory rate should be expected to reverse itself as the compulsory rate rises towards the market, and does not justify any further reduction to the musical works rate. This is discussed in more detail below.<sup>3</sup>

B. The Board’s analysis correctly reflected Nash bargaining principles

14. When the services and the labels negotiate the sound recording royalty to use, they are bargaining over how the net surplus from operating the interactive music streaming service will be shared among the two of them. They will thus calculate the value of the net surplus, and then work out how to share it. The term “net surplus” is meant to indicate the level of service revenue less the monetary costs of both the services and the labels of jointly creating the surplus, once an acceptable agreement on sharing the proceeds has been reached. One of those monetary costs is the payment for securing the musical works copyright license.

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<sup>3</sup> I note that Dr. Katz framed his concerns with my bargaining model as being about testimony “that appear to have played central roles in the Majority’s findings with regard to whether the vacated rate structure would satisfy the 801(b)(1) statutory objectives.” (Katz Remand Written Direct Testimony (“Katz RWDT”), ¶ 12) This description seem decidedly at odds with the actual use of bargaining theory by the Board. As discussed above, this issue was addressed to concerns about setting the appropriate rate level, and the Board itself noted (quite accurately) that these insights apply “to *any* rate structure that results in an increase in what services pay for musical works.” (Final Determination at 74) And while it is always good to see bargaining theory appreciated, it seems a bit exaggerated to call this point a central part of the Board’s finding of rate structure. To the contrary, the Board’s rate structure ruling, and particularly its expansion of the use of a true TCC rate prong, does not reference bargaining theory. Instead the Board references the need for protection “to avoid the undue diminution of revenue through the practice of revenue deferral.” (Id. at 36) I agree with this reasoning, and indeed my report discussed these revenue diminution concerns (Watt Written Rebuttal Testimony (“Watt WRT”), ¶¶ 19-20, 38-40, 54-65 (HX-3034), as did the Written Direct Testimony of Marc Rysman (HX-3026), and the Written Rebuttal Testimony of Joshua Gans (“Gans WRT”), ¶74 (HX-3035), submitted in the original proceeding. It is notable to me that none of the Service Experts here challenged that copyright owners face revenue diminution and measurement problems. It would seem that they are acknowledging that the Board’s reason for expanding the use of a true TCC rate prong was well-founded.



15. There are two important economic principles surrounding a bargaining situation such as that between the services and the labels, namely:

- i. All of the available net surplus will be shared.
- ii. Neither of the bargainers will demand a share such that more than the total net surplus is shared.<sup>4</sup>

16. Essentially, the first point says that no money will be left on the table, and the second point says that no bargainer will demand a payment that is so high that the shared enterprise itself will be destroyed. That is, the bargaining parties do not destroy a pursuit from which they can obtain positive payoffs. In short, in a bargaining situation, exactly all of the available surplus (neither less nor more of it) will be shared between the bargainers.

17. The first of these two core principles leads directly to the Board's insight that, where a party takes proportionately more when net surplus goes up, that party gives back in that proportion when net surplus goes down, which is the proper understanding of a type of "see-saw" effect.<sup>5</sup>

18. The second core principle tells us at least two relevant insights. First, as noted above, bargaining parties do not destroy enterprises from which they obtain net positive payoffs, and it is not reasonable to speculate that bargaining parties will make demands that cause the destruction of an enterprise from which they profit. Second, if a party to a bargain appears to have a negative payoff, there is expected a missing element that is providing that party with sufficient economic benefit to agree to the negotiated deal. As has been discussed

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<sup>4</sup> The assumption is that there do exist feasible bargains that make both bargainers simultaneously better off than walking away, that is, there exists a mutual incentive to bargain in the first place.

<sup>5</sup> This can be a counterintuitive conclusion, as it may be tempting to think that the more bargaining power an entity has, the less it will give up if surplus is tight. But bargaining theory recognizes that higher bargaining power *would be already manifest* in the determination of shares. The party with the higher bargaining power *already* bargained for all the surplus that they could, leaving no basis to assume that they could obtain higher shares if net surplus is reduced.

in these proceedings at length, in the streaming marketplace this economic benefit is often deferred or displaced revenues, which do not appear in present accounting statements (but which may be perceptible in company share value, which economists understand to reflect discounted expected future profits).

C. The analyses of Drs. Katz and Marx support the relevant conclusions of the Board

19. The analyses of both Drs. Katz and Marx centre upon the “straw man” argument that a “dollar for dollar” sound recording rate reduction (measured as a percentage of revenue) did not occur to match a musical works rate increase. (Marx Remand Written Direct Testimony (“Marx RWDT”), ¶ 27 (stating her understanding that the Board assumed that “any increase in musical works royalties would be fully offset by an equivalent dollar-for-dollar decrease in sound recording royalties.”); Katz RWDT, ¶ 84 (“The Majority attempted to justify [its rate increase] by assuming that any increase in the statutory royalty for musical works will be almost entirely offset by a hypothesized decrease in the negotiated sound recording royalty rates—the see-saw effect.”)) This is particularly strange since, as discussed below, the sound recording rate [REDACTED]

[REDACTED]. But their arguments are theoretically unsound even before they are factually incorrect. Drs. Katz and Marx argue that the [REDACTED] claimed lack of a decrease in sound recording royalties makes my original model (and the basic insights that the Board obtained from it) invalid. However, the same principles and insights that underlie the Board’s reasoning on bargaining theory appear in Drs. Katz’s and Marx’s own alternative models. In the models in both of their recent reports, a one-unit increase in the statutory musical works rate still predicts a corresponding decrease in the sound recording rate equal to the labels’ bargaining power. This is exactly the same relationship that is present in my original model. All that may be different between my original model and that of Drs. Katz and Marx is the assumed size of the labels’ bargaining power.

20. Dr. Katz undertook a Nash bargaining analysis in his rebuttal report in the original proceeding that reflects these same conclusions. In that report (which was written before he had seen my rebuttal report), Dr. Katz was not trying to avoid the “see-saw effect,” but embraced it, explaining that:

When record companies and interactive services bargain over royalty rates, they are bargaining over how to divide the surplus (i.e., economic profits) available to them if they reach agreement. That surplus will be equal to the total revenues generated by the streaming of the record companies’ songs minus the amounts paid to other suppliers of necessary inputs (e.g., server manufacturers and, critically, music publishers). The more that is paid to the other input owners, the less surplus to be divided between the streaming services and record companies, and—all else equal—the lower will be the royalties paid to record companies by interactive streaming services. Stated in the other direction, all else equal, the lower the payments made to music publishers, the greater the level of surplus split between the services and record companies and the higher the resulting royalty rate paid to the record companies by interactive services. Therefore, if the royalties paid to music publishers are artificially suppressed, then the royalties negotiated by record companies will be artificially inflated.

(Katz Written Rebuttal Testimony (“Katz WRT”), ¶ 67)

21. This is a correct statement of Nash bargaining dynamics, and I believe it reflects the same insights that the Board noted. In particular, Dr. Katz correctly notes the same movement of the “see-saw” goes in both directions. As discussed above, under the Nash model, the proportions of surplus division do not change depending on whether surplus is increasing or decreasing. Dr. Katz [REDACTED] in his deposition in this proceeding:

Q. [REDACTED]

Dr. Katz: [REDACTED].

(Transcript of June 8, 2021 deposition of Dr. Katz (“Katz Dep. Tr.”) at 147:8-14)

22. Thus, regardless of what proportion of the surplus we attribute to the record companies, bargaining theory predicts that whatever was “artificially inflated” will be

“deflated” when the artificial effect is removed. Drs. Katz and Marx do not contest this basic insight, but rather adjust the assumptions in their models to assume a lower level of bargaining power for the record companies and a higher level of bargaining power for the streaming services. Dr. Marx states directly that her adjustments “would yield a substantially lower bargaining power parameter and thus a substantially lower see-saw effect.” (Marx RWDT, ¶ 38) Dr. Katz likewise explains that in the economic formulas, the Greek letter  $\mu$  is the bargaining power parameter, and that, “ $\mu$  is also the rate at which the see-saw effect occurs,” and that his adjustments would “lead to even lower estimates of  $\mu$ .” (Katz RWDT, ¶¶ 123, 136)

23. To be clear, both Drs. Katz and Marx did not base their alternative assumptions on any facts, but merely speculated that the levels of bargaining power could be different. (E.g., Marx RWDT, ¶ 45 (stating that she highlights supposed data issues in the model “not to suggest that there is a ‘right’ set of data that Professor Watt should have used, but to note that the model is highly sensitive to the particular data used”)) However, since the same symmetrical “see-saw effect” holds regardless of how much bargaining power is assumed, one might ask why Drs. Katz and Marx speculated a different level of bargaining power.

24. The answer is that both Drs. Katz and Marx are trying to have their cake and eat it too. They seek to take one half of the see-saw effect and deny the other half. They argue that, if we assume a lower level of bargaining power, then the record companies would be expected to give back less if the musical works rate went up, and more of the burden would fall on the Services. However, they studiously ignore that, if this was the case, *it is because the record companies did not have sufficient bargaining power to extract the surplus in the first place, and so have less surplus to give back, while the Services have more bargaining power and more surplus to give back.* There is simply no way around the symmetry in the Nash bargaining analysis. Either the labels extracted the surplus, and then they would



relinquish it if the surplus decreased, or the Services extracted the surplus, and then they would relinquish it if the surplus decreased. No bargaining party is extracting all of the surplus and then refusing to relinquish surplus when it decreases (thereby destroying its profitable enterprise), yet this is the unprincipled outcome that Drs. Katz and Marx attempt to insinuate through incorrect modelling without any supporting evidence.<sup>6</sup>

25. The relationship between the statutory musical works rate and the negotiated sound recording rate that is derived in the Nash bargaining model is a basic economic principle that holds true in any bargaining model at all in which one makes the assumption that the market players are rational decision makers.<sup>7</sup> It is not limited to the simple Nash bargaining scenario that I assumed, although that particular model has been widely accepted as being a relevant environment in which to study bargaining games between rational players. In my original bargaining model, I was looking to explain a helpful economic insight that could be of use in understanding the rate-setting and bargaining environments. The basic economic principles and messages that we get from the model will still be present, in any model of bargaining with rational players, no matter how complex. But the more complex is the model, the more likely that its useful messages will become masked and hard to see. More simplified models, such as that which I employed, separate the economic “wheat from the chaff,” by

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<sup>6</sup> On this point, I highlight the phrasing of Dr. Katz in stating that, “in addition to being the bargaining-power parameter,  $\mu$  is also the rate at which the see-saw effect occurs.” (Katz RWDT, ¶ 123) It must be clear that these two qualities of  $\mu$  are of course *related*.  $\mu$  does not just happen to be both of these things.  $\mu$  is the rate of the “see-saw effect” exactly *because* it is the bargaining-power parameter, which identifies the portion of surplus that a party extracted in the first place.

<sup>7</sup> Again, the two core principles of bargaining apply: rational players will not leave surplus “on the table,” and neither will they bargain so as to destroy the enterprise. These principles tell us that if there is a reduction in the surplus at stake, the two bargainers must share out that reduction between them, by accepting lower payoffs. A model that allocates most of the residual surplus to one particular player will also feature the result that most of the required reduction due to lower shareable surplus will also be absorbed by that same player.

distilling the important information and the important messages from the noise. The Board captured the “wheat” of bargaining theory on this issue in the Final Determination.

D. The assumption that labels have very low bargaining power also assumes that there is no complementary oligopoly power problem

26. The alternative modelling of Drs. Katz and Marx seeks to lower the level of bargaining power of the labels within the bargaining setting with the services. (E.g., Marx RWDT, ¶ 38; Katz RWDT, ¶¶ 123, 136) As noted above, this is in service of an improper “have your cake and eat it too” approach to Nash bargaining. The argument also invites one to consider what determines the bargaining power of the parties in a negotiation situation. Standardly, bargaining power includes any element that enables a party to end up with a relatively larger share of the available surplus. One such element is the market power that a bargaining party has.<sup>8</sup> In other words, the hypothesis that Drs. Marx and Katz employ to challenge bargaining theory is concomitant with the conclusion that the record companies do not wield abusive complementary oligopoly power. Drs. Katz and Marx cannot credibly play both sides of this question: hypothesizing that the labels have weak relative bargaining power for the purpose of reducing the expected “see-saw effect” if surplus is reduced, while also maintaining that the labels extracted the surplus in the first place and exercise abusive complementary oligopoly market power that distorts the market and calls for a reduction in fair rates and terms.

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<sup>8</sup> In Dr. Katz’s direct testimony in the original proceeding, he stated that monopoly power would be reflected in a high bargaining power. (Transcript of hearing testimony (“Hrg. Tr.”) at 577:16-19 (“... I agree that if you had one side in a private negotiation that had way more bargaining power than the other, and a much better position, say a monopolist, ...”))



V. The Board's bargaining insights were sound regardless of the [REDACTED] in sound recording rates as a percentage of Service Revenue

A. Assessing a total royalty rate as a percentage of revenue is flawed

27. Dr. Marx puzzlingly claims that the Board determined that the Services should receive a particular percentage in total combined royalties, measured as a percentage of their declared Service Revenue. I do not see any basis for this claim in the language of the Final Determination, and it would conflict with the rest of the Board's reasoning, which found that additional rate prongs are necessary to protect against revenue diminution. As a matter of simple math, the effect of an alternative rate prong is precisely to increase the royalty rate as a percentage of revenue. Given the Board's judgment that alternative rate prongs are necessary, it is contradictory to suggest that the Board determined that the Services should be limited to a particular combined royalty rate measured as a percentage of Service Revenue.

B. The *ceteris paribus* assumption must always be recognized

28. As noted above, the Services try to "have their cake and eat it too" with respect to bargaining theory. Their strategy is to posit that there was no decrease in sound recording royalties, and then argue that the bargaining analysis was flawed as a result. As discussed below, [REDACTED], but I think it is important to understand that the Services' arguments are also theoretically, and not just empirically, unsound.

29. The Nash model as posed in my rebuttal report was constructed as a reply to the original expert report of Dr. Marx, and so it was deliberately constrained to the sort of setting that she used in her report, and adopted factual assumptions that she proposed, although I noted my belief that her assumptions were in fact incorrect. The point of my report was to show bargaining insights that bore upon aspects of the case, and to show that these insights applied even under the analysis as posed by Dr. Marx.

30. As my report indicated, I used Dr. Marx's setting and her data assumptions which implied that the labels were extracting nearly all of the surplus in their bargains with the streaming services. The Board noted this in the Final Determination, commenting that "Professor Watt calculates that, for each dollar that the statutory rate holds down fair market musical works royalties, ■ cents is captured by the record companies (and ■ cents is captured by the streaming services)." (Final Determination at 73, fn 132) This assumption, *that the labels were extracting ■ cents out of each dollar of increased surplus*, is what drives the bargaining theory conclusion that the labels would bear that same proportion of the burden of a *decrease* in surplus. This is the symmetry assumption discussed above, which Dr. Katz endorsed in his testimony at the hearing in the original proceeding:

DR. KATZ: ... put another way, when the mechanicals went up, not all of the loss would be suffered in terms of having less surplus, not all of the loss would be suffered by the Services. Some of the loss would be suffered by the record companies.

JUDGE STRICKLER: What factors would determine the relative suffering by the sound recording companies and the Services in that regard?

THE WITNESS: So it could come down to what effects are their marginal—their bargaining power at the margin, and which could be different than sort of how they are doing overall, and, you know, we have various bargaining models, how good a job—I am just not sure. I mean, it would just come down to the whole structure of the actual bargaining. I think there would be—I think the thing economists could safely say is there would be some split of both, but I think that all of us in various ways have really had to do it just through examples. You know, I've talked about Nash Bargaining. And, you know, there is—I guess I can't go into it, but Dr. Gans did an analysis of this issue in his rebuttal report where he does this—I will say he did it. And then as we talked about Dr. Watt has done this, but I don't think any of us really has a handle on what the number is, but I agree there would clearly be some effect. ...

JUDGE STRICKLER: But depending on the Services bargaining position, if it is strong enough, they may end up in a zero sum situation where the surplus simply gets reallocated between the Copyright Owners and the record labels but the Services are just left in a status quo position?

DR. KATZ: That would actually happen if the copyright—I think this is right, if the Services' bargaining position was weak enough, it would actually work that way because they are basically getting no surplus anyway, so it is just a fight between the two. The Services are in a stronger bargaining position at the



margin, then they are actually—then they are hurt more by it because they were getting the surplus anyway. And now when you take the surplus away from the pool between the record companies and the Services, when that pool gets smaller, that actually hurts them more because they were getting more of the pool before.

(Hrg. Tr. at 5083:18-5085:21)

31. This again correctly captures standard bargaining theory on this issue and supports the reasoning of my original model and the Board’s analysis. If one assumes that the labels are extracting nearly all of the surplus, then—all else equal—we should expect to see a decrease in the sound recording rate if there is an increase in the musical works rate, such that combined royalties would stay almost the same. This is, as Dr. Katz testified, “because [the services] are basically getting no surplus anyway.” (Id. at 5085:11-12) As discussed above, this effect is what bargaining theory predicts, and Dr. Katz’s bargaining model in his rebuttal report in the original proceeding, as well as his and Dr. Marx’s models in their new remand reports, do not reflect a different logic.

32. However, to make the jump from the model to the actual real-world effects, one cannot ignore the words that are omnipresent in all economic modelling, that predictions about causal relationships are understood to be “all else equal.” Generally known in economics by the Latin term *ceteris paribus*, this principle is fundamental. As the Nobel laureate and economist James Buchanan wrote, “At the heart of any analytical process lies simplification or abstraction, the whole purpose of which is that of making problems scientifically manageable. In the economic system we recognize, of course, that ‘everything depends on everything else,’ and also that ‘everything is always changing.’”<sup>9</sup>

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<sup>9</sup> Buchanan, J. (1958), “Ceteris paribus: Some notes on methodology,” *Southern Economic Journal*, Vol. 24(3); p. 259.

33. This principle is evident in Dr. Katz’s rebuttal report in the original proceeding, where he explains that, “The more that is paid to the other input owners, the less surplus to be divided between the streaming services and record companies, and—all else equal—the lower will be the royalties paid to record companies by interactive streaming services.” (Katz WRT, ¶ 67 (emphasis supplied))

34. The economic obviousness of the relevance of *ceteris paribus* makes the attempts of Drs. Katz and Marx to ignore it particularly disheartening. Bargaining theory tells us that if the labels were extracting nearly all of the surplus then, *if the available surplus decreases*, the labels should be expected to proportionally decrease the surplus that they take. However, there are quite apparent reasons why available surplus may not decrease even if the musical works rate increased, because of simultaneous changes to other variables in the model. Dr. Katz [REDACTED] in his deposition:

Dr. Katz:

[REDACTED]

Q.

[REDACTED]

A.

[REDACTED]

(Katz Dep. Tr. at 126:4-127:3)

35. A “see-saw effect” occurs when, because of an increase in the statutory rate, the service and label have a smaller residual surplus to share, and this leads to each absorbing a part of the surplus reduction in a smaller payoff, with the party having the largest claim to

marginal surplus (which will be the party with the highest bargaining power) adjusting their negotiated claim the most. In other words, a model in which only the two copyright rates are permitted to change (as was the understanding in my original model), allows the system to derive a clear relationship between those two rates, and that relationship is that an increase in one leads to a decrease in the other, that is, the “see-saw effect.”<sup>10</sup> But if it happens that the shareable surplus does not decrease along with the increased musical works rate (that is, something else changes along with the musical works rate), then the net effect does not predict that the negotiated rate of the labels will decrease. This result is absolutely a feature of the model I put forward, and it is also present in the adjusted models of Drs. Marx and Katz. The fact that these models easily generate situations of no change in the label’s negotiated rate despite an increase in the musical works rate, such as if streaming services’ costs also decrease or their revenues increase, is a testament to the fact that the existence of a “see-saw effect” is the result of rational behaviour of the bargaining parties and relies upon there being less residual surplus for them to share, and so the lack of a “see-saw effect” is equally the result of rational behaviour of the bargaining parties when the residual surplus that they can share does not change.

36. This scenario of simultaneously changing variables is hardly exotic but rather is to be expected. Moreover, in the streaming market, two variables are likely candidates to be changing so as to increase residual surplus, namely the streaming services’ non-content costs are falling, and their displaced revenue is rising.

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<sup>10</sup> In essence, this reflects the core principles of bargaining set out above: all surplus should be shared, and it would never be logical or rational for labels to purposefully attempt to close a deal with the streaming services at a negotiated rate that would endanger the very existence of the business from which they (the labels) derive a good deal of revenue (perhaps by insisting upon an unchanged rate from before the statutory rate increase, when overall residual shareable surplus has decreased).

### C. Service non-content costs are falling

37. In my analysis of the non-content costs of the Services, carried out in 2017 and using as a guide actual and estimated ratios of Service non-content costs to revenues, it was clear that the ratios were decreasing over time. This is to be expected as the market grows and the major participants benefit from increasing economies of scale. My analysis of Spotify's estimates informed my assumption of [REDACTED] for that ratio in my calculations, but also noted that the ratio was lower for larger companies. (Watt WRT ¶ 33, fn 21 (HX-3034)) Professor Gans reached a similar conclusion, based on a review of the evidence, that non-content costs should continue to fall. (Gans WRT, ¶¶ 44-54 (HX-3035)) It should be expected that the downward trend of this ratio has continued, as the market has grown and become increasingly dominated by larger and larger companies. In this case, the decreasing non-content costs would *increase* residual surplus, and such increases could easily offset any decrease in residual surplus from an increase in the musical works rate.<sup>11</sup>

38. To put this point as clearly as possible, we can state a bargaining theory prediction as: "holding all other values constant, a one unit increase in the statutory rate will result in a decrease in the labels' negotiated rate equal to their bargaining power." But if we eliminate the restriction that all other values remain constant, to allow for more real-world outcomes, we can state a corollary prediction: "a one unit increase in the statutory rate together with a one unit decrease in the ratio of non-content costs to revenue of the streaming service will lead to an unchanged value of the labels' negotiated rate." As we can see, many real-world outcomes in the sound recording rate might be consistent with the bargaining analysis, depending on movements in costs and revenue displacement.

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<sup>11</sup> My understanding is that financial documents identifying these costs were requested in discovery by the Copyright Owners, but were not provided by the Services.



D. Service displaced revenue is rising

39. As has been noted above, the Board and even the Services' own experts have recognised that there exists a problem of displaced revenue in the streaming market. That is, the services routinely receive financial benefits from interactive streaming in ways that are not directly included in the revenue that is attributed to interactive streaming in any given period. The growth of large, diversified companies like Amazon, Apple and Google in the streaming space, and the diversification of companies in the space like Spotify, surely increases the problems of displaced or deferred revenue. The reality of the negotiations around payments to the copyright holders in interactive streaming markets is that the revenue that is reported by the services from within those markets is not an accurate measure of the true "surplus" that should be shared, and changes in the true surplus are masked from the analyst, even though portions of those changes might be known (or estimated) by the negotiating parties.

40. Dr. Katz [REDACTED]:

Q. [REDACTED]

DR. KATZ: [REDACTED]

Q. [REDACTED]

DR. KATZ: [REDACTED] ...

Q. [REDACTED]

DR. KATZ: [REDACTED]

(Katz Dep. Tr. at 86:8-18, 90:7-18)

## VI. The empirical evidence supports the Board's bargaining theory insights and contradicts the Services' arguments

41. The royalty history of the Services is remarkable in light of the arguments that they have put forward in this remand proceeding. As discussed above, the Services' straw-man argument concerning the "see-saw" misses the theory completely. The Board's bargaining theory insights about the relationship between royalty rates were correct, which is not a guarantee of a particular outcome in the future. Outcomes in the future depend on *all* of the variables. The Services attempt to judge the model based on a claimed outcome that depends on far more variables and does not address the issue at hand.

42. But this approach is particularly mystifying where sound recording royalty rates in fact [REDACTED]. I am baffled at how the Services' experts could spend so much effort contriving a flawed bargaining theory argument around the claim [REDACTED]. It is also quite disconcerting that the Services' experts did not call attention to the true royalty history as part of their analysis. It cannot be said that these facts are not relevant to the Services' experts' analyses, and their decision not to collect the facts from their clients and include them in the analyses reflects a serious failure of diligence and transparency.

43. The Services' economic experts, in particular Dr. Marx, seem to have relied entirely upon an extremely simplistic set of numbers provided by Mr. Bonavia (and confirmed by Mr. Kung). Those numbers are shown graphically in Dr. Marx's remand report in Figure 6 (in paragraph 50). There are only [REDACTED]. The graph provided by Dr. Marx also shows [REDACTED]. For the sake of argument, let us consider this average, which reports an [REDACTED].

[REDACTED]. The first thing that is worthwhile to notice, is that moving from [REDACTED], and moving from [REDACTED]. In short, these changes are [REDACTED].

44. Notwithstanding the [REDACTED] reported by the Spotify expert, the other main thing about the numbers is that they are misleading as an indication of the actual royalty payment history of the Services in general, and of Spotify in particular. It is particularly mystifying that Dr. Marx puts forward a claim of [REDACTED]. When one consults the actual data, the sound recording payments made by the Services as a fraction of their reported revenue [REDACTED]. The relevant analysis has been carried out by Dr. Eisenach, using the royalty reports of the Services, and is discussed in detail in his rebuttal report in the present remand. (Eisenach Remand Written Rebuttal Testimony (“Eisenach RWRT”), §II(A), Appendix C) With respect to the particular Figure 6 in Dr. Marx’s report I mention above, Dr. Eisenach presents an astonishing chart showing how deceptive that figure is compared with the reality to be gathered from Spotify’s royalty reports (which Dr. Marx of course could have reviewed herself). (Id. at ¶¶ 37-43)

45. Dr. Eisenach’s analysis reveals that all of the Services, including Spotify, generally paid [REDACTED]. (Id. at § II(A)) This means that the sound recording rate [REDACTED],



although I found it very interesting that even the musical work rate itself [REDACTED] [REDACTED] as a result of family and student plan discounts in the *Phonorecords III* rates. (*Id.* at ¶¶ 79-84)

46. I want to emphasize that these results should not be seen just through the lens of a “see-saw effect.” For example, the actual sound recording rate decreasing *more* than the actual musical work rate increases most certainly does *not* mean that  $\mu$  should be higher than 1 in a Nash bargaining model. As discussed above, there are plainly other variables affecting rates beyond just the compulsory musical work rate, some of much larger impact on the Services than the compulsory musical work rate. But what this empirical evidence does confirm is that it is nonsense for the Services to argue that there has been a failure or “collapse” of my Nash bargaining model or a flaw in the Board’s insights from bargaining theory on these issues. The actual outcomes are fully consistent with the model and the insights drawn from it by the Board.

A. The evidence does not support any inference of a risk of disruption to the streaming industry from higher musical works royalty rates

47. Also striking in the royalty history is the [REDACTED] of musical work royalty rate changes on the Services. Musical work royalty rate changes are often [REDACTED]  
[REDACTED]  
[REDACTED] have not resulted in any disruption to the Services.

48. After nearly three years under the *Phonorecords III* royalty rates, Dr. Katz argues that the “status quo” should be maintained because “there has been a strong supply of new, high-quality musical works and ongoing investment in the creation of innovative streaming services.” (Katz RWDT, ¶ 110) He clarifies that this means continuously from 2012 to the present:



Q.

[REDACTED]

DR. KATZ.

[REDACTED]

(Katz Dep. Tr. at 52:16-53:12)

49. That Dr. Katz does not [REDACTED]

[REDACTED]  
[REDACTED] punctuates the point that is also apparent from the royalty history charts, namely that [REDACTED]  
[REDACTED]  
[REDACTED]. On charts that show (i) the musical work royalty rate, (ii) the sound recording royalty rate and (ii) the combined royalty rate, the top two lines, the sound recording royalty rate and the combined royalty rate, [REDACTED]  
[REDACTED].

50. However, I think there is even more import to Dr. Katz's observation. Dr. Katz also does not see a difference in the characterization of the streaming industry's consistent success across the various periods of [REDACTED]  
[REDACTED]. Combined rates [REDACTED] (which occurred under the *Phonorecords II* rate structure) did not deter the growth of streaming services, and indeed Spotify's most recent royalty statements for its bundled offerings (also under the *Phonorecords II* rate structure) show that royalties [REDACTED]

██████████, as this is what Spotify would pay for its bundled offerings *under its own rate proposal*. (Eisenach RWRT, ¶¶ 85-89.)

51. This explains other facts that are most interesting about the Services' activities. In reviewing the responses of the Services to written interrogatories, it is quite conspicuous that the Services [REDACTED]. It appears from their written testimony that some Services [REDACTED]. But when asked to describe communications [REDACTED], some Services [REDACTED]. (Ex. U to Copyright Owners' Remand Submission (Responses to Interrogatory No. 5)) Surely no bargaining party thinks that the other side to the bargain will [REDACTED]. Surplus must be actively bargained for, in part because the demands of the other side signal their positions. As discussed above, the Services have a tremendous asymmetry of information in their negotiations with record companies. Only the Services know truly how much surplus they are obtaining from the bargain. The Services' [REDACTED], particularly as they grow and experience higher stock prices (which reflects their expected future profits) with those rates, speaks far more to the issue than arguments in legal proceedings.

## VII. The Services' bargaining analyses use incorrect modelling

52. The empirical evidence corroborates the Board’s bargaining theory reasoning, and shows the Services’ “see-saw” attacks to be misplaced. Still, the record should be set straight on Nash bargaining theory, and the foundational errors in the analyses put forward by the Services.

53. Drs. Katz and Marx presented alternative models of Nash bargaining that are largely the same. The material difference between their models and mine (which Drs. Katz and Marx are critiquing) is their inclusion of a potential payoff, an “outside option,” for the label. They both model the outside option as equivalent to a cost that gets reimbursed to the label prior to negotiation.<sup>12</sup> An outside option is a payoff that the label would receive if negotiations with the service do not result in an agreement.<sup>13</sup> An outside option could also be referred to as an “opportunity cost”, since it is the value of what would be foregone should a deal with the service actually be struck.<sup>14</sup> It is, in fact, useful to recognise the equivalence between an outside option and an opportunity cost, because economics in general has a very long history of understanding how opportunity costs weigh in on economic decision making.

#### A. The Services misuse outside options in their models

54. In paragraph 16 of his rebuttal report, Dr. Katz’s opinion is:

Perhaps the biggest single problem with Professor Watt’s analysis of the see-saw effect is that his Nash bargaining model relies on an extremely unrealistic assumption with respect to the payoff that a label would earn if it failed to reach an agreement with a streaming service.

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<sup>12</sup> Dr. Katz specifically describes the variable in question as an “outside option” in his report. (Katz RWDT, ¶ 127) [REDACTED]

[REDACTED] (Transcript of June 2, 2021 deposition of Dr. Marx (“Marx Dep. Tr.”) at 41:4-55:25) I agree [REDACTED] that the variable [REDACTED] is what is known in the economics literature as an “outside option.”

<sup>13</sup> Dr. Katz’s analysis hypothesizes an additional possible change to the costs of the labels, which I discuss further below.

<sup>14</sup> [REDACTED] (Marx Dep. Tr., 54:4-7) [REDACTED] In other proceedings before the CRB, for example *SDARS III*, this exact same concept has been routinely identified and referred to as an opportunity cost. For example, in the *SDARS III* final determination, footnote 79 reads “Sirius XM’s rebuttal economic expert, Professor Farrell, concurred with the substance of this definition, agreeing that walk-away opportunity cost ‘is the profit that a label would realize elsewhere’ if it did not license to Sirius XM. 4/24/17 Tr. 607 (Farrell).” (83 Fed. Reg. 65229, fn 79) The opportunity cost concept in that proceeding was put forward by Professor Willig, who defined “a record label’s walk-away opportunity cost as ‘compensation that it would earn from other sources of distribution’ if a label were ‘to literally walk away from a distributor.’ 5/2/17 Tr. 2014-15 (Willig).” (83 Fed. Reg. 65229)



and

His reliance on this unrealistic assumption is critical because disagreement payoffs play a central role in determining the outcome of a bargaining model of the type that Professor Watt considers.

This same sentiment is also present in the rebuttal report of Dr. Marx.

55. Drs. Katz and Marx claim that the outside option value that the labels would enjoy should they not reach an agreement with the services should be included as part of the “disagreement point” within the bargaining model and reimbursed like a cost prior to bargaining.<sup>15</sup> Doing this can dramatically alter the results of the model. It is also definitively not how such an option should be modelled. Drs. Katz and Marx are both guilty of misunderstanding the Nash bargaining model, and concretely, the meaning of a “disagreement point,” and the way that an outside option should be brought into the model.<sup>16</sup>

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<sup>15</sup> The practical result for Drs. Marx and Katz of modelling an outside option as equivalent to a reimbursed cost is that it allows them to transfer surplus to the label outside of the bargaining power parameter. In bargaining models, parties bargain over net surplus (profit), which is surplus after each party gets reimbursed the costs that went out of their pocket on behalf of the joint enterprise. The bargaining power parameter is meant to capture the proportion of available surplus that a party takes, which is the same proportion that the party would give back if surplus decreases. This is, as discussed above, the “see-saw effect.” By handing profit to a label “under the table” as a cost, Drs. Marx and Katz model the label as having bargained for less than it did, which has the result of lowering the bargaining power parameter and the “see-saw effect.” As discussed above, the fatal flaw with this modelling trick is that no matter how the numbers are manipulated, the label is still predicted to give back net surplus in proportion to how it obtained net surplus. Drs. Marx and Katz are ultimately just modelling the labels as having taken less of the available surplus, and by extension, modelling the services as having taken more of the available surplus, which itself should eliminate any concerns about label market power.

<sup>16</sup> In her deposition, Dr. Marx [REDACTED]:

Q. [REDACTED]  
[REDACTED]  
[REDACTED]

A. [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

56. Bargaining models, and in particular the Nash bargaining model, are designed as self-contained portrayals of negotiating behaviour. Given a surplus to share, the Nash model works out the unique solution sharing rule that satisfies four very reasonable assumptions on rational behaviour (see Muthoo (1999)<sup>17</sup> for details). The model does provide allowance for *financial* payments that a party is *actually* receiving, only while negotiations are *ongoing*, *without* walking away for another option, and that would cease as a result of the deal, to be factored into modelling as a cost in some situations. These have been alternately called the status quo, disagreement or impasse points, and Dr. Marx [REDACTED] [REDACTED]. (Marx Dep. Tr. at 41:4-48:13; 76:18-81:8)

57. But the opportunity costs that Drs. Katz and Marx are discussing are without question “outside options” as in the literature (and their own words) and not the types of status quo actual financial payments that may be modelled as disagreement points. Indeed, both of them explain them as payoffs from *substitution*, in other words they are an option *instead of* the deal, and they are not actual financial payments, but opportunity costs. In the case at hand, if the parties never stop negotiating and never take up substitute options, then no joint enterprise is offered and there is no surplus to share, so each necessarily gets a payoff equal to 0, just as I assumed in my model.

58. Now, against this backdrop, how should an outside option (a potential payoff that is not directly related to a share of the surplus that is being negotiated) be brought into the model? The answer is that it comes in as a constraint upon the set of feasible deals that could

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(Marx Dep. Tr. at 81:15-82:5)

<sup>17</sup> Muthoo, A. (1999), *Bargaining Theory with Applications*, Cambridge University Press.

be struck, exactly as an opportunity cost would be treated.<sup>18</sup> Concretely, if the labels do indeed have an outside option of the sort imagined by Drs. Katz and Marx, and say that outside option is valued at \$X, then a constraint would be placed upon the negotiation process such that whatever is the deal struck between the two parties, it cannot give the labels a payoff that is smaller than X. If the (unique) *unrestricted* Nash bargaining solution were to give the labels a payoff that is greater than X, *then the outside option plays no role at all in the solution*. We can see, then, that outside options act in every way as opportunity costs to the bargaining parties.<sup>19</sup>

59. Given that Dr. Marx cites in her report both the landmark paper by Binmore, Rubinstein and Wolinsky (1986),<sup>20</sup> and the authoritative book on bargaining by Abhinay

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<sup>18</sup> In discussing the negotiated settlement of 2012, for which the outside option was to have the rate set by the Board in a statutory hearing, Dr. Katz states "... a rational party is not going to agree to a settlement if that party thinks it could do better by going to the proceeding." (Hrg. Tr. at 571:12-15) This is the recognition that the outside option should be treated as a constraint on the bargaining process, or an opportunity cost, and not reimbursed like a financial cost. In discussing how parties should approach an outside option during the bargaining process, Dr. Katz opined that the parties would require that from the bargain the parties should make sure they are "... each doing as well as we could through the proceeding, they then will set about and say what do we do that's the best for both of us and we'll try to jointly maximize." (Id. at 571:18-21) Again, we see that the outside option acts as a constraint upon the bargaining process rather than a parameter that alters the negotiated outcome. Dr. Katz again discussed how bargaining parties would act in the presence of an outside option (which again is a Board proceeding), specifically, Dr. Katz is commenting on a part of the expert report of Dr. Eisenach; "... each of us will say, well, I have to get at least as good a deal as if I went to arbitration. Okay? But then what he's saying is ... he goes well, that may be true but what does that have to do with the specifics of what people end up agreeing to? Okay? It just says we have to at least do as well, but why does that tell us anything about the details of our agreement? Our agreement is going to tend to be what we think is ever best for us. And I agree with that statement." (Id. at 574:21-575:6) In this testimony, Dr. Katz agrees that, so long as the bargained outcome is better for both parties than the outside option, the outside option becomes irrelevant for what actual bargain is struck.

<sup>19</sup> It is particularly well-known that, if a person is considering a business opportunity that can deliver a maximal net payoff (monetary profit) of, say \$Y, but where undertaking the business has an opportunity cost of \$X, then the business will only be undertaken if  $Y \geq X$ . And, assuming this inequality is satisfied, the opportunity cost plays no part in formulating the optimal strategy of the business. Dr. Katz gives a sound discussion of this in his textbook *Microeconomics* on the shutdown decision of a firm. (Katz, M.L. and Rosen, H.S. (1991), *Macroeconomics*, Irwin Inc.; pp. 233-234)

<sup>20</sup> Binmore, K., Rubinstein, A. and Wolinsky, A. (1986), "The Nash Bargaining Solution in Economic Modelling," *The RAND Journal of Economics*, Vol. 17(2); pp. 176-188.

Muthoo (1999), it is particularly misplaced that she should bring an outside option into the model as a disagreement point. Both of those cited works clearly explain that an outside option should not be used as a disagreement point. Binmore et al. (1986) even provide a definition of an outside option matching the payoff that Drs. Katz and Marx erroneously identify as a disagreement payoff. (Binmore et al. (1986) at p. 185 (“An outside option is defined to be the best alternative that a player can command if he withdraws unilaterally from the bargaining process.”)) Binmore et al. (1986) also provide a formal proof of the fact that an outside option is not equivalent to a disagreement point (their Proposition 6), concluding with the proposition statement that “ $s^0$  [the disagreement point] should not be identified with the outside option point  $e$ .” (Id.)

60. This feature of Nash bargaining with outside options is not a tiny esoteric detail hidden deep within the theoretical literature. It is in fact one of the main postulates upon which the theory sits. It is so important, that it even has its own specific name; the “Outside Option Principle.” It can be found in the paper cited by Dr. Marx (Binmore et al. (1986) at pp. 185-86), and it is also a central issue of discussion in the book cited by Dr. Marx (Muthoo (1999)). In Muthoo’s book, the Outside Options Principle is put forth and fully explained in Corollary 5.1 (p. 103), and Muthoo notes that:

It is evident from Corollary 5.1 that if each player’s outside option is less than or equal to the share she receives in the (limiting) SPE of Rubinstein’s model ..., then the outside options have no influence on the (limiting) SPE partition.

(Muthoo (1999) at p. 103)<sup>21</sup>

61. Muthoo continues with the statement that the Outside Options Principle captures “the notion that players should not be influenced by threats which are not credible.”

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<sup>21</sup> The “(limiting) SPE of Rubinstein’s model” is a fancy way of referring to the Nash bargaining model.

(Id. at 104) Finally, as if the point was not already made, Muthoo concludes his discussion with the statement:

I thus emphasize that the outside option point does not affect the disagreement point.

(Id. at 105 (emphasis in the original))

62. Two further notable examples of where the principle<sup>22</sup> is discussed are: (1) Osborne, M. and Rubinstein, A. (1990), *Bargaining and Markets*, Academic Press; pp. 56-60 (Propositions 3.5 and 3.6) and p. 88 (“... it is definitely not appropriate to take as the disagreement point an outside option ...”),<sup>23</sup> and (2) Muthoo, A. (2006), “Bargaining Theory and Royalty Contract Negotiations,” *Review of Economic Research on Copyright Issues*, Vol. 3(1); pp. 19-27 (“A key principle is that a player’s outside option will increase his bargaining power if and only if the outside option is sufficiently attractive; if it is not attractive enough, then it will have no effect on the bargaining outcome. This is the so-called outside option principle (OOPS). Contrary to what is often suggested, OOPS tells us that having an outside option (such as an alternative record contract) will not necessarily increase your bargaining power; it will not necessarily enable an artist to extract a higher royalty rate from a record company. In order to do so, the alternative contract must yield a royalty rate that is higher than what is being offered.”).

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<sup>22</sup> The Outside Option Principle has been known since the mid-1980s. See, for example, Sutton, J. (1986), “Non-Cooperative Bargaining Theory: An Introduction,” *The Review of Economic Studies*, Vol. 53; pp. 709-724; Binmore et al. (1986) at pp. 176-188; and Shaked, A. and Sutton, J. (1984), “Involuntary Unemployment as a Perfect Equilibrium in a Bargaining Model,” *Econometrica*, Vol. 52(6); pp. 1351-1364. The Outside Options Principle has also been tested experimentally. See Binmore, K., Shaked, A. and Sutton, J. (1989), “An Outside Option Experiment,” *The Quarterly Journal of Economics*, Vol. 104(4); pp. 753-770. The principle was originally set down in alternating offers bargaining games, but since it happens that the alternating offers game converges to the Nash game, in the end what is true for one is also true for the other. Thus, the Outside Option Principle carries over to the Nash bargaining model. This was first put forward by Binmore et al. (1986), and it is emphatically proved by Muthoo (1999) at Corollary 5.2.

<sup>23</sup> This book continues to be one of the most authoritative works on bargaining. Rubinstein is, along with Nash, one the founders of modern bargaining theory.



63. Compounding their violation of the Outside Option Principle, Drs. Katz and Marx also introduce an outside option *only for the labels*. However, there is no question that both sides to the bargain have opportunity costs. After all, if a deal is not reached, the service will then relocate its investment into some other profit-generating venture. The violation of the Outside Option Principle is a clear error by Drs. Katz and Marx. The use of an outside option as a disagreement point *for only one side of the bargain* can only be seen as a deliberate attempt introduce a bias into the model.

B. An outline of Nash bargaining without and with an outside option

64. Given the Services' focus on the Nash bargaining model in these proceedings, and given the misunderstandings of the model that have been promoted by Drs. Katz and Marx, it may be useful for the Judges if I provide a review of the logic of how Nash bargaining models operate, especially in connection with outside options.

a. An illustrative example of bargaining without and with an outside option

65. Say **Simon** (S for seller) has a car that he values at \$8,000 and that he would like to sell, and **Bob** (B for buyer) values that same car at \$10,000. There is a \$2,000 surplus that the two can share, and the way that surplus is shared is determined by the price,  $p$  that they agree to. Clearly, for Simon to participate, we require  $p > \$8,000$ , and for Bob to participate, we require  $p < \$10,000$ . In this problem, when the two bargain over  $p$ , if they arrive at an agreement, Simon gets surplus of  $p - \$8,000$ , and Bob gets surplus of  $\$10,000 - p$ , both of which are positive. The sum of Bob's surplus and Simon's surplus,  $(\$10,000 - p) + (p - \$8,000) = \$2,000$ , is the total surplus available, and all that the price  $p$  does is to divide that total surplus

in some way between the two bargainers. Effectively, both Simon and Bob have disagreement payoffs equal to 0,<sup>24</sup> and both have outside options of 0.

66. After some haggling, they agree upon  $p = \$9,000$ . This price effectively gives both Simon and Bob \$1,000 of surplus. However, before they sign the sale agreement, suddenly Olivia (O for outside option) arrives and makes a take-it-or-leave-it offer on the car of \$8,500. Now, Simon has an outside option that is better than not selling at all, but worse than selling to Bob. Notice that Simon's disagreement payoff is still 0 (this is what he gets from the deal with Bob, if that deal results in no agreement), but he now also has an outside option (external to the deal with Bob) of \$500 (the outside option is equal to the price at which Simon can sell the car to Olivia, \$8,500, less his value of the car, which is still \$8,000). The question is, should the sudden appearance of the outside option alter what Bob will pay? Is there any risk that Simon will abandon the deal with Bob in order to take up Olivia's offer, effectively exchanging a \$1,000 gain for a \$500 gain? The answer, of course, is no. Simon and Bob will simply ignore Olivia's offer, and the deal will still go through at \$9,000.

67. This example shows that an outside option is irrelevant when it is worth less than the deal that would be struck without the outside option. In economic parlance, the outside option does not constitute a credible threat to the negotiations.<sup>25</sup> This is also exactly what one would conclude by noting that, since the outside option is lost if the deal goes ahead, the outside option is in fact an opportunity cost for Simon on the deal. All that happens, in pure economic

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<sup>24</sup> In a disagreement, both Simon and Bob are left with exactly what they each had before entering into negotiations, that is, neither of them earns any surplus from this bargaining situation. This is a common situation, and disagreement payoffs are commonly zero.

<sup>25</sup> Nash bargaining is built upon several axioms, one of which is the "independence axiom," which essentially states that the addition or removal of possible agreement points that would not be chosen anyway, is irrelevant to the bargaining process. An outside option that is dominated by the deal is an irrelevant option (it would never be chosen), and so the bargained outcome is independent of the inclusion or not of that outside option.

terms, is that the outside option reduces Simon's *economic* surplus (or *economic profit*) by \$500, since his economic surplus is equal to his financial surplus (the \$1,000 surplus gain he gets by selling to Bob) less the opportunity cost (the \$500 surplus he would get by selling to Olivia). But since Simon's economic profit from the deal with Bob is still strictly positive, we know that he will choose to close the deal with Bob rather than to take up the outside option.<sup>26</sup>

68. In the Nash bargaining model proposed by Drs. Katz and Marx, the size of the outside option *does* affect the deal being struck. This can be seen in their equations, which posit that the higher the value of the outside option, the lower must be the labels' bargaining power in order to keep the deal at a given level. (Katz RWDT, ¶¶ 131-132; Marx RWDT, ¶ 30) In other words, if we were instead to keep the bargaining power constant and allow the deal to vary, then the larger is the outside option, the more favourable would be the deal for the labels. This is equivalent to Simon being able to increase his deal with Bob up to, say, \$9,250 when Olivia turns up with the offer of \$8,500, which is clearly illogical.

#### C. The Services' hypotheticals violate Nash bargaining principles

69. Both Drs. Marx and Katz criticise my Nash bargaining model by suggesting that there are values for the non-content costs of the streaming services for which the model would produce a bargaining power of the labels that is above 1, whereas, in theory bargaining power is restricted to be between 0 and 1. (Marx RWDT, ¶ 43 and Figure 1; Katz RWDT, ¶¶ 23, 131) Such a suggestion is patently absurd, and displays a lack of understanding of bargaining theory. It is rather objectionable that the Services' experts not only employ such an argument, but also

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<sup>26</sup> If Olivia's offer were, say, \$9,250, then Simon's outside option is better than the current deal with Bob. In that case, Bob will increase his price to match that of Olivia, since Simon now has a credible threat to abandon the deal with Bob and sell the car to Olivia instead. Of course, even at a price of \$9,250 Bob still earns a strictly positive surplus (\$10,000 – \$9,250 = \$750), and so he will definitely agree to the new price, given that his outside option remains at 0.



claim (or imply) that I would have done the same. I never suggested, and much less analysed, such absurd outcomes.

70. In order to see the absurdity of the argument put forward by Drs. Marx and Katz, we only need to go back to the fundamental underlying principles of any bargaining situation. In particular, neither of the bargaining parties has an incentive to destroy the enterprise by demanding a share of revenue so high that it makes the remaining surplus for the other party so low that it is not in the other party's interest to pursue the deal any longer.<sup>27</sup> This is why it is unreasonable for Dr. Marx to put forth the position she does in footnote 49 to paragraph 43 of her remand report. There she notes that if the service's non-content costs are high enough (she takes the value of ■%), then the total claims against service revenue are above 100%, implying a bargaining power for labels greater than 1. The reasoning behind this is absurd, since it predicts a deal *that would not happen*, one where the labels insist upon ■% of (actual) revenue, even though (actual) non-content costs are ■% and the musical works rate is above ■%. This does not translate to a bargaining power above 1. This translates to a demand by the label that the service *would not agree to*, leading to the destruction of the enterprise. It is fundamental to bargaining theory that a party is not going to agree to a deal that costs them more than it brings them. Yet this is exactly the deal that Dr. Marx plays out for the service, claiming that it "highlights the fragility and unreliability of Professor Watt's result." (Marx RWDT, ¶ 43) On the contrary, Dr. Marx's example highlights her misunderstanding of the basic principles of bargaining theory.<sup>28</sup> It must be emphasized that where the model says

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<sup>27</sup> In fact, strangely Dr. Katz clearly recognized this fact in his own oral testimony: "Streaming is important to music distribution now, so if the Copyright Owners got a deal that was so good that it – you know, good here means that the price was so high, the royalty rate so high that it killed off streaming, that would be bad for them. And, similarly, if the streaming services said, oh, we can get this stuff for free and that turned out to destroy songwriting, that would be bad for them." (Hrg. Tr. at 572:4-9)

<sup>28</sup> Dr. Katz also appears to believe that labels are willing to negotiate the music streaming business into bankruptcy. In paragraphs 75 to 79 of his remand report, he attempts to mystify the Judges with

“revenues” it means *all* revenues, and when the model says “costs” it means *all* costs. If we equate revenues in bargaining models to Service Provider Revenue as it is defined in the Board’s regulations, we can get all sorts of results that appear to violate the principles of bargaining. Service Provider Revenue is narrowly defined and does *not* capture all revenue due to the revenue deferment and displacement events. Examples of streaming services agreeing to royalty rates that are higher than their Service Provider Revenue should not be interpreted to support modelling parties as agreeing to deals that are a net loss for them. On the contrary, the insight we can take away from situations is simply that Service Provider Revenue is not capturing all of the revenues.

D. Dr. Marx’s additional modelling errors illustrate the outside option error

71. Dr. Marx has also defined the outside option in her analysis in a way that makes her resulting equations and Figure 3 of her remand report quite misleading, in addition to being incorrect for including an outside option as a disagreement point in the first place. For Dr. Marx, the outside option,  $\varphi$ , is “the fraction of streaming revenue the label could get from other distribution channels in the event of disagreement.” (Marx RWDT, ¶ 76) The understanding then is that the label’s payoff when there is disagreement in the bargaining process is  $\varphi R$ . However, in the event of agreement at a royalty rate of  $\delta$ , giving income of  $\delta R$ , the label receives a payoff equal to  $\delta R(1 - r_L)$ . That is, Dr. Marx recognises that when the label earns money from an agreement, some of that money is used up as costs (as was the case in her original Shapley model), but then fails to recognise the same when the money earned by the label comes from an alternative source. What Dr. Marx has done is to recognise (correctly)

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numerical examples involving TCC rates, in which he essentially increases the costs of offering the service without decreasing the label’s negotiated claim, even when that negotiated claim results in negative surplus for the service. Of course, in any situation in which the initial claim of the label would drive the business into closure, the label will obviously reduce their claim.

that the label's income from streaming is net revenue (*i.e.*, revenue less costs), but she assumes that money earned from other sources is counted as gross revenue. This makes her analysis as it stands a case of comparing apples with oranges.

72. In order to fix this issue, we need to re-interpret the parameter  $\varphi$  in Dr. Marx's model. It is not really (as she asserts) the fraction of streaming revenue that the label can get from alternative sources, but rather it actually measures the fraction of *net* streaming revenue that is earned from other sources. That is, if the true fraction of lost interactive streaming revenue that the labels can receive from alternative sources is denoted by  $\beta$ , then we actually have  $\varphi = \beta(1 - r_L)$ . And it is  $\beta$ , rather than  $\varphi$  that can be logically compared with  $\delta$ .

73. To see how this alters things in the model as proposed by Dr. Marx, the equation that she presents in paragraph 77 of her remand report, which shows the calculation for the negotiated sound recording rate, should actually be (found by substituting  $\varphi = \beta(1 - r_L)$  into the equation in Dr. Marx's report):

$$\delta = \mu(1 - r_d - \theta) + (1 - \mu)\beta.$$

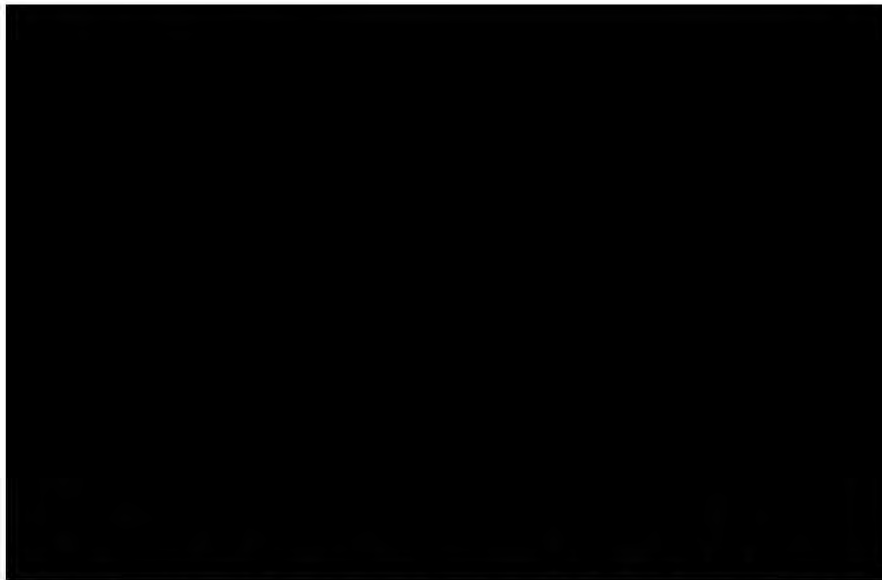
74. The resulting appropriate form of the equation that Dr. Marx has in paragraph 78 is:

$$\mu = \frac{\delta - \beta}{(1 - r_d - \theta) - \beta}.$$

75. This is the equation that Dr. Marx should have graphed in Figure 3 of her remand report.

76. The first thing to notice is that, when the analysis of Dr. Marx is done properly, the only way that the bargaining power of the labels can go to 0 is if the outside option rate of capture of revenue is as high as the negotiated sound recording rate, that is, ■■■ (not ■■■ as is calculated by Dr. Marx). Indeed, the actual graph that Dr. Marx should have presented is

everywhere above the one that she did show in Figure 3. The two graphs, drawn in the same figure, are the following (the black curve is that which was drawn by Dr. Marx, the red curve is the one that she should have drawn):



77. For example, if the outside option is valued at  $\beta = \blacksquare$ , then rather than the “see-saw effect” going to 0 (as Dr. Marx states in paragraph 36), it is in fact as high as  $\blacksquare$ . If the outside option takes the value  $\blacksquare$ , then the “see-saw effect” is still  $\blacksquare$ .

78. This Figure 3 from Dr. Marx also lays plain the absurdity of using the outside option as Dr. Marx uses it. The y-axis on this graph is the bargaining power parameter, with the lower values being low bargaining power and the higher values being higher bargaining power. Thus, as the curve moves towards the x-axis, it reflects lower bargaining power. The x-axis on this graph represents the value of the outside option to the record company measured as a percentage of service revenues (.1 = 10%, .2 = 20%, etc.). Recall that in this model, we posit the label share of revenues as  $\blacksquare\%$ . This corresponds to  $\blacksquare$  on the x-axis of this graph. And it is not coincidence that  $\blacksquare$  is where the curve intersects with the x-axis. The effect that we see in this graph is that, in Dr. Marx’s misspecified model, as the label’s outside option gets *larger*, the label’s bargaining power gets *lower*, to the point that if the label’s outside option



was as high as the value of the streaming deal (■%), then Dr. Marx concludes that the label has no bargaining power. One need not be an economist to see the problems with the assumption that as one's outside options grow stronger one's bargaining power gets weaker, and when one has an exceptionally strong outside option, one has no bargaining power. Dr. Marx has tried so hard to find ways to manipulate the bargaining power parameter (in vain, since as discussed above, a lower "see-saw effect" would not undermine the Board's reasoning on this bargaining theory issue) that it seems her model has disconnected from the concept of bargaining power altogether.

E. Dr. Katz's inclusion of further costs for the labels

79. Dr. Katz critiques my Nash bargaining model in respect of the functional form of the cost functions that were used. (Katz RWDT, ¶¶ 128-134) Specifically, that the labels' cost function is entered as being linear in the amount of the royalty received, and contains no fixed cost element. (Id.) Again, I think that Dr. Katz has lost sight of the fact that my model was to comment on Dr. Marx's original report, and so I deliberately imported as many of her functions and data as possible in order that everything be as comparable as possible. Thus, the choice of functional forms was not really mine in the first place.<sup>29</sup> Nevertheless, I do not agree that it is the case that these should be interpreted as regular cost functions anyway—the number ■ is Dr. Marx's estimate of the ratio of total costs to total revenue of the labels, (Marx Written Direct Testimony ("Marx WDT"), Appendix B, ¶ 174), and thus it includes any fixed cost element already. It is therefore incorrect for Dr. Katz to include a fixed cost for a second time in the model—doing so is double-counting those costs. The formulation used by Dr. Marx simply implies that the total value of costs is ■ times label revenue, and that is exactly how

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<sup>29</sup> See Katz remand report, ¶ 126. The choice of cost modelling that I used came directly from the original testimony report of Dr. Marx, and it was never an assumption of my own.



I imported it into my Nash model. Greater revenue should be directly equated with a larger scale of business, and therefore it is not particularly inconsistent that costs should increase with royalty income (which Dr. Katz is reticent to believe—see Katz remand report paragraphs 22 and 126). For a start, the additional royalty income would have to be managed (*i.e.*, distributed to those who need to be paid from it, such as artists), implying higher administration costs.

80. The inclusion of a fixed cost element, as Dr. Katz has done, is clearly another calculated effort to bias the outcome in favour of a smaller “see-saw” effect.<sup>30</sup> It is immediate to see that the fixed cost that Dr. Katz introduces plays exactly the same role as does the outside option that he introduces, and thus it contributes to moving things in the direction that Dr. Katz would like to see. However, it seems pertinent to ask why Dr. Katz has decided that only the labels should have a fixed cost, and not the services. Simply put, including a fixed cost for the services in the way Dr. Katz has included it for the labels, would move the outcome of the model in the direction that Dr. Katz is not interested in.

81. In paragraph 128 of his remand report, Dr. Katz states:

The fact that Professor Watt’s assumptions are problematical can be seen by the property that, given observed sound recording royalties, his estimate of  $\mu$  is independent of the label’s non-content costs. Intuitively, one would expect that, holding the observed license fee constant, seeing higher non-content costs would lead to the analyst to attribute less bargaining power to the licensor.

82. In fact, in Dr. Katz’s own equation (displayed in his remand report at paragraph 125) that relates bargaining power to the other parameters of the problem, given a value for the negotiated sound recording rate, if the fixed cost that Dr. Katz has included were to be 0 (as it

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<sup>30</sup> Further, as discussed above, these efforts by the Services to contrive a smaller “see-saw effect” through inappropriate modelling changes *still* do not undermine the Board’s reasoning on bargaining theory. Rather, the smaller see-saw effect they posit would just indicate that the record companies had low bargaining power such that (i) their royalties had not been so inflated in the first place by the compulsory mechanical rate being set below market (e.g., because the services have substantial displaced or deferred revenues that the Shapley analysis captures but the Service Provider Revenue definition does not), and (ii) the labels do not constitute a complementary oligopoly.

legitimately should be), then in his equation exactly the same result happens—the estimate of  $\mu$  is independent of the label’s non-content costs (since in Dr. Katz’s notation,  $\omega = \sigma\delta^0(1 - r_L)$ , so the term  $(1 - r_L)$  appears as a common factor on both the denominator and numerator, and thus cancels). And since, as I have just pointed out, it is incorrect for Dr. Katz to include a fixed cost that is separate from the total cost figure (taken from Dr. Marx’s original report) that is already included in the model, it should indeed be the case that Dr. Katz’s fixed cost is taken to be 0.<sup>31</sup> Therefore, Dr. Katz’s own model contains exactly the same feature that he is critical of in my model, and which is not a flaw in the bargaining model.<sup>32</sup>

### VIII. Dr. Katz’s critique of Shapley analysis is incorrect

83. Dr. Katz is particularly critical of the use of the Shapley model in an analysis of the rate-setting problem, and in his remand direct report he criticises my rebuttal report from the original hearing around the concepts of “abuse of market power” and “holdout”, and the possible relationship between those concepts and the Shapley model. Given Dr. Katz’s confusion on this point, I begin by emphasizing that in my testimony around the Shapley model,

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<sup>31</sup> In paragraph 133 of his remand report, Dr. Katz continues with the idea that the labels’ costs should be entirely independent of the royalty rate. Dr. Katz trials the idea that the labels’ costs are independent of the royalty rate ( $\delta$ ), but then he sets the cost equal to a fraction of revenue of  $0.27 = 0.45 \times 0.60$ , where the factor 0.60 is precisely the royalty rate  $\delta$ . When Dr. Katz uses his original equation for bargaining power, the royalty rate was held constant at 0.6. (Katz RWDT, ¶ 129) In this alternative perspective, it is still held constant at 0.6, and so it is untrue that the costs are now independent of the royalty rate (given that the same 0.6 is used to calculate the costs). All that Dr. Katz’s manipulation of costs does is to reduce the non-content costs to revenue ratio of the labels to something that is below what Dr. Marx assumed it to be in her original report (an assumption that I adopted to make points about her model in my rebuttal).

<sup>32</sup> In any case, Dr. Katz’s observation regarding a relationship between the label’s non-content costs and bargaining power has no substance. What is being negotiated is a sharing of the surplus of the services, not a sharing of the profit of the label. It is entirely reasonable, and in fact intuitive, that a change in the label’s non-content costs has no effect on the bargaining power that the label has in the bargaining problem at hand.

I always had in mind (and tried to explain clearly) that “abuse of market power” is in fact “holdout.” That is, in as far as Shapley goes, the two are one and the same thing.

84. I emphasize the fact that a player having a dominant position relative to others, which we may refer to as “market power,” is, in and of itself, neither problematic nor anti-competitive. Having market power is quite different from using that market power strategically in order to hamper competition, or otherwise to gain a benefit over and above the value that the market, in normal circumstances, places upon the dominant position. In short, having market power is very different from abusing market power.

85. For the case of input suppliers to a common enterprise, if one of the input suppliers holds an input that is essential to the enterprise while the others do not, then clearly that input supplier has a dominant position, or some degree of market power. Abuse of that market power might, therefore, come in the form of the essential input supplier holding out for a payoff that exceeds what otherwise he or she would receive. There is absolutely nothing wrong, legally or morally, in a supplier charging a high price. If the input concerned is extremely valuable to the enterprise, then it is only fair that its value is recognised with a higher than normal payment. What is wrong is strategically managing a dominant position in order to inhibit competition, and thereby receive a payoff that exceeds the normal value of the input’s contribution.

86. Consider, for example, the situation of Cristiano Ronaldo in European football (soccer).<sup>33</sup> He is only one of eleven players on whichever team he is contracted to who would be on the field of play in any given game. The eleven players are all inputs to a common enterprise, but they will all be paid differently, with Ronaldo likely paid the highest of all. Why

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<sup>33</sup> Of course, this example can be rephrased to represent any super-star athlete in any professional sport, such as LeBron James and basketball, or Tom Brady and American football.



should that be? Simply because Ronaldo is worth so much more to a football team than are the other players, or to use our economics parlance, Ronaldo holds much more market power as an input supplier than do the other team members. There are plenty of players that are, essentially, close substitutes for the other 10 team members, but Ronaldo is rather unique, or again in economics terms, he is a player that has no close substitute, or a monopolist of sorts. That is recognised in his higher salary, and there is nothing overtly wrong or even inefficient with that, indeed, it is entirely fair. It is the simple economic fact that scarce resources are highly valued, or that in general high quality is costly. Above all, it is certainly not true that Ronaldo's salary necessarily represents a hold-out problem.

87. We can use the analogy of Ronaldo to simplify a music streaming business down to a "team" requiring three players—a sound recording copyright, a musical works copyright, and a streaming service. As it happens, there are several streaming services that are essentially substitutes for each other. But the musical works provided by the copyright owners and the sound recordings provided by the record companies are unique. The songs and the recordings of those songs are, therefore, the equivalent of the star athletes on a team, and it is only normal that this is recognised in the payoff that they receive from the music streaming enterprise. That is not abuse of their position, it is a valid market valuation of the importance of their relative contribution to the success of the business.<sup>34</sup>

88. Now, even though *a* streaming service is essential to the enterprise, any *one* of the available substitute services would do. The streaming service that participates does therefore deserve a payoff, since it does provide value to the business, but the substitutability between services implies that the payoff that is required to employ a service should be lower

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<sup>34</sup> And, of course, the Section 801(b) factors are clear in that the compulsory royalty rate should be set so as to reflect the relative contributions of the parties.

than the payoff for the other inputs which do not have substitutes. An abuse of the market position of one of the essential input suppliers would happen if, by holding out as the final input to set the enterprise in motion, that input supplier were to hijack the business and receive a payment that is greater than its true economic value, likely at the expense of the substitutable input's payoff. That is exactly the sort of conduct that the Shapley model removes as feasible, since by construction, all input suppliers *do* make their input available to the enterprise, in each and every feasible arrival ordering. There is simply no room in the Shapley setup for any input supplier to hold out and arrive last all the time. It is for that simple reason that I assert that the Shapley model eliminates the effects of abuse of market power (which in Shapley is the act of holding out). By construction, holding out in a Shapley model is impossible (and, therefore, any credible threat of holding out is eliminated also), and, correspondingly, so are any and all effects of holdout eliminated.

A. Dr. Katz's examples reinforce the appropriateness of the Shapley analyses

89. Starting at paragraph 32 of his remand report, Dr. Katz offers a series of simple examples that he uses in an attempt to debunk the Shapley model as one that promotes "effective competition". I agree that they serve to show an important point. However, the point that they make is not the one that Dr. Katz posits. The examples show that the Shapley model values inputs at their real and fair worth, by removing any holdout or strategic interferences in the remuneration of inputs. Take the example in paragraph 32 of his report, in which Dr. Katz resolves the Shapley model with a highly scarce and highly valuable player (the single "type-A" player, who is an essential input into value creation), and an abundance of players with low value ("type-B" players, each one a perfect substitute for the others). Unsurprisingly, the Shapley model allocates almost all of the surplus to the scarce and valuable player. According to Dr. Katz, it is "precisely because the type-A player can hold out that he or she gets so much of the surplus." (Katz RWDT, ¶ 33) *This is clearly not true*, since by

construction the Shapley model simply does not permit the type-A player the option of holding out, and so the high payoff *cannot* possibly derive from the ability to hold out (or the threat to hold out). The reality is that the type-A player in the example receives so much of the surplus because he or she is both very scarce and very valuable, essentially just as a football player like Cristiano Ronaldo is scarce, valuable, and highly remunerated.

90. In his paragraph 35, Dr. Katz complicates his example a little, to move to two type-A players, while retaining the abundance of type-B players. He shows that between them, the two scarce and valuable players still get almost all the surplus. However, in this model, the two scarce players together take home slightly less than in the single type-A player example. Again, this is completely the result of the scarcity and relative value of the type-A players remaining high (relative to the multitude of type-B players), but slightly lower in this example compared to the first (they are now substitutes for each other). The Shapley model accounts for the now (slightly) diminished scarcity and relative value of the type-A players by reducing their aggregate payoff. But their relative scarcity and value in the two type-A player examples still converges to that of the single type-A player example when the number of type-B players goes extremely large. This shows that it is indeed scarcity and value relative to the total population of players that matters, and that is what is remunerated. It is not for the reason that Dr. Katz believes, and he quite incorrectly states that, “a type-A player can be thought of as having a high Shapley payoff because it has the ability to hold out.” (Katz RWDT, ¶ 36). The Shapley model used in the example removes the ability to hold out, and therefore it is impossible that the payoff reflects such an ability. The payoffs capture only and exclusively the value of the relative contribution of the players to surplus creation.

91. In short, the fact that in a Shapley model, scarce and valuable players receive a high payoff is absolutely fair and just. It reflects the reality that good and scarce things cost



more. Above all, in a Shapley model, a high payoff cannot reflect any *abuse* of a scarce and valuable position, such as would be a threat to hold out.

92. In Dr. Katz's paragraph 40, again we find another of his examples that reinforces the merit of the Shapley model in arriving at fair surplus divisions. This example shows that a Shapley model of a monopoly does not return perfectly competitive payoffs. That outcome, of course, is not surprising at all. Again, the Shapley model will give payoffs that reflect the true and fair value of the players' contributions, so if there is a monopolist (who is therefore scarce and essential), that player should end up with a large payoff. It seems to me that in his discussion of this example, Dr. Katz is confusing "effective" competition with "perfect" competition. They are not the same thing, nor even close to the same thing.<sup>35</sup> And if one is using a Shapley model in which a monopolist is placed, that model cannot ever end up with a perfectly competitive outcome.<sup>36</sup> The model places a fair and true value on the players' contribution to surplus, and a monopolist is a valuable player to be sure, since in a coalition that does not include the monopolist, there would be no product (since an essential input would be unavailable) and no surplus at all.

93. It is interesting to wonder why, in this example, as opposed to the first example (which also contained a monopolist, but who ended up with almost all the surplus), the monopolist only gets about half of the surplus. The answer is that this new example allocates more of the surplus to the other players (the type-B players), because each and every one of them now adds value to any coalition containing the monopolist, whereas in the earlier

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<sup>35</sup> It is particularly surprising that Dr. Katz is confused about effective vs. perfect competition given that, in his direct oral testimony, when speaking on the definition of "effective competition," Dr. Katz said, "I don't mean a perfectly competitive market." (Hrg. Tr. at 555:14-15)

<sup>36</sup> Dr. Katz returns to a similar argument, with the same confusion between effective competition, monopoly and perfect competition, in his paragraph 66, where he "shows" that a Shapley analysis of a monopoly does not produce a perfectly competitive outcome, which is neither surprising nor improper.

example, only one of them added value in each coalition containing the monopolist. In the new model, the type-B players are more valuable. Thus, again we see that making players more valuable to surplus creation (this time the type-B players), results in the Shapley model allocating them a greater share of the surplus.

94. Dr. Katz concludes the example in paragraph 41 with, “In other words, the Shapley Value does not eliminate the effects of the type-A player’s market power.” I agree with Dr. Katz on this point. The Shapley model finds great value in the type-A player’s market position, and it is fair that a high remuneration should be allocated to that great value. The Shapley model is, after all, designed exactly for that purpose—it remunerates players according to their relative contribution to the creation of surplus. What Shapley eliminates, and completely eliminates, is any ability of the type-A player to use a position of scarcity and value to unfairly extract additional surplus by acting strategically against the pool of other players. That is, it removes abuse of a market position.

95. The final Shapley example provided by Dr. Katz, in paragraph 43 of his remand report, is arguably the most useful in showing the fair operation of the Shapley analysis. In this example, he shows how a Shapley model with two price-setting duopolists allocates about one-third of total surplus to the duopolists, rather than allocating them zero which would be the case in a Bertrand model of duopoly pricing. Why does this happen? Precisely the reason why Bertrand duopolists end up at zero surplus is because they act strategically, although in this case, in their own detriment rather than their own betterment. But the Shapley model does not distinguish between favourable and unfavourable strategic practices, it eliminates the effects of *any* artificial strategic actions. It thus overrides the Bertrand model by valuing the two duopolists at a fair remuneration, one that truly reflects their contribution to this little economy. This example points out very clearly how the Shapley model gets around any strategic imperfection in the valuation of the contribution of players to the creation of surplus.



96. The examples provided by Dr. Katz serve as a stark reminder of exactly why the Shapley model is a perfect fit for the rate-setting process for the statutory musical works license. The Section 801(b) factors further require that the rate reflects the relative contribution of the parties to the business, and that is exactly what the Shapley model does (as is perfectly illustrated by Dr. Katz's examples). In fact, as is proved by Young (1988), the Shapley value is the *unique* sharing rule that simultaneously satisfies the conditions that (i) it allocates all of the surplus, (ii) it allocates the same payoff to players who contribute equally to the creation of the surplus, and (iii) the payment that is allocated to each player depends only on the contribution of that player to surplus creation.<sup>37</sup> By "unique sharing rule", it is meant that it is mathematically impossible that there exists *any* surplus sharing scheme *other* than the Shapley value that simultaneously achieves the three stated outcomes. Stated in other words, any other (non-Shapley) alternative sharing rule must fail to satisfy at least one of the three outcomes mentioned. Since the three outcomes that only the Shapley value methodology can simultaneously fulfill are practically a re-statement of Section 801(b) factors B and C, I think that it is rather hard to argue that the Shapley value is not appropriate for satisfying the 801(b) factors.

97. In paragraph 38 of his remand report, Dr. Katz writes that he is "... unaware of any article in the vast academic literature regarding the Shapley Value that asserts it was designed to 'remove abuse of market power.'" But the literature contains a multitude of assertions that the Shapley Value is designed to *promote fairness*, or what is the same, *remove unfairness*. Abuse of market power is something that is inherently unfair. So while the literature may not have been drafted to meet Dr. Katz's specific wording, it is replete with

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<sup>37</sup> Young, H.P. (1988), "Individual contribution and just compensation," in Roth, A.E., *The Shapley Value. Essays in honor of Lloyd S. Shapley*, Cambridge University Press; pp. 267-278.

assertions that are the same in substance. And in an article analysing fair, reasonable and non-discriminatory (FRAND) pricing to avoid abuse of bargaining power by patent holders holding out in negotiations, Layne-Farrar et al. (2007), writing in the *Antitrust Law Journal*, show how the Shapley value returns calculable payoffs that do indeed satisfy FRAND, and therefore remove abuse of market power.<sup>38</sup>

## IX. Dr. Katz's analysis surrounding effective competition is incorrect

98. Throughout his remand report, Dr. Katz repeatedly attempts to convince the Judges that a Shapley analysis does not return an effectively competitive market. For example, in paragraph 39 we see "... the next two examples prove that the outcome of a Shapley analysis can starkly fail to correspond to the outcome of an effectively competitive market." (Katz RWDT, ¶ 39) Then, Dr. Katz (in paragraph 40) provides examples in which there is a monopolistic seller facing many potential buyers. (Id. at ¶ 40) Dr. Katz is at pains to point out that his Shapley analysis of such a setting does not correspond to what would occur under perfect competition. Likewise, in a similar example, again with a monopoly player, in paragraph 41 Dr. Katz again shows that the Shapley outcome is not particularly close to the perfectly competitive outcome. (Id. at ¶ 41)

99. I have already explained at length above how a Shapley analysis allocates surplus where surplus is deserved, and so whenever one introduces a monopoly element, of course the outcome will not be that of perfect competition. Monopolistic players are normally very valuable to the market, and so will command a significant share of surplus in a Shapley

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<sup>38</sup> Layne-Farrar, A., Padilla, J. and Schmalensee, R. (2007), "Pricing patents for licensing in standard-setting organizations: Making sense of FRAND commitments," *Antitrust Law Journal*, Vol. 3; 671-706.

model. All that they will not be able to receive is surplus over and above their true contribution to surplus creation by strategically managing their monopoly position.

100. In any case, I do think that Dr. Katz's interpretation that "effective" competition should resemble "perfect" competition, misses the mark by a long shot.<sup>39</sup> If one goes back to the seminal literature on "effective" (or, in some cases the denomination "workable" is used) competition, one gets a much better feel for the sort of market situation that was always envisaged to be effectively competitive. Clark (1961, pg. ix)<sup>40</sup> states, "Some departures from pure and perfect competition are not only inseparable from progress, but necessary to it." Likewise, Mason (1957, pg. 179)<sup>41</sup> notes, "The fact that large numbers of buyers and sellers *will* ensure workable competition does not mean, however, that such numbers are necessary." Even earlier in the literature, Adelman (1948, pg. 1303)<sup>42</sup> makes it even clearer that a certain amount of market power is indeed required in a workably competitive market: "A proper blend of competitive and monopolistic elements is needed in any particular market to produce workable competition." More recently, Bender et al. (2011, pg. 5)<sup>43</sup> remind us that "The concept of workable competition introduced by Clark explicitly takes market power into account and constitutes the basis for what today is termed effective competition in economic

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<sup>39</sup> And, as I have already commented above, in his own direct oral testimony, Dr. Katz emphatically argues that effective competition is not perfect competition. (Hrg. Tr. at 555: 14-15) When describing effective competition, Dr. Katz ends with "I don't mean a perfectly competitive market." (Id.)

<sup>40</sup> Clark, J.M. (1961), "Competition as a Dynamic Process," The Brookings Institution.

<sup>41</sup> Mason, E.S. (1957), *Economic Concentration and the Monopoly Problem*, Harvard University Press.

<sup>42</sup> Adelman, M. (1948), "Effective Competition and the Antitrust Laws," *Harvard Law Review*, Vol. 61; pp. 1289-1350.

<sup>43</sup> Bender, C.M, G. Götz and B. Pakula (2011), "Effective Competition: Its Importance and Relevance for Network Industries," *Intereconomics*, 1; pp. 4-10. Later on, in the same article, Bender et al. provide some interesting advice for regulators: "... regulators should take into account that a variety of different market settings are in line with what economic theory would call a competitive market." In short, effective competition is certainly not as clear-cut as Dr. Katz apparently believes.



theory and law.” Furthermore, Bender et al. (2011, pg. 6) recognise that “Effective competition does not imply absence of market power.” Indeed, any economist will, or should, understand that the ability to earn profit is the underlying source of incentives for investment, for efficiency, and for innovation. In a well-respected textbook on competition policy, Motta (2004, pg. 89)<sup>44</sup> states this in the following words: “The prospect of having some market power (i.e. some profit) represents a most powerful incentive for firms to innovate and invest.”

101. In short, it is very wrong to imply, as Dr. Katz does, that effective competition requires absence of market power and the ability for valuable contributors to surplus creation to have that value recognised in payoffs that are high relative to other players in the same market. This is particularly true as he [REDACTED]  
[REDACTED] (Katz Dep. Tr., 49:3-6) [REDACTED]  
[REDACTED]

## X. Dr. Marx’s “imbalance” problem is not a sound analysis

102. In paragraphs 55-66 of Marx’s remand report, Dr. Marx uses a concept that she coins as the “imbalance problem.” (Marx RWDT, ¶¶ 55-66) This is a concept that she has invented, it is not based on any accepted economic principles and unsurprisingly cites to no economic literature or theory. Particularly ungrounded is her suggestion that the Board should set the compulsory musical work rate with a goal to help deliver to the services surplus that she says the services “should” get from their free market deals with the labels. This concept is simply unworkable. The services bargain with the labels for their rates, and it is that process that sets those rates. The judges cannot change that outcome even if they wanted to. As my original bargaining model (and Drs. Katz and Marx’s as well) explains, holding down the musical works rate below its fair value is either: (a) unnecessary or (b) ineffective. My feeling

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<sup>44</sup> Motta, M. (2004), *Competition Policy: Theory and Practice*, Cambridge University Press.

is that it is unnecessary because the services bargain with the labels and so will reach an appropriate market result. However, if one disagrees and finds the services unable to bargain with the labels and forced to take prices from them, then it is wholly ineffective. Holding the musical work royalty rate down would just deliver additional surplus to the labels. I do not see a scenario in which it would be fair or effective to try to penalize a regulated industry through a compulsory license in order to subsidize one unregulated industry in its negotiations with another unregulated industry.

## XI. Dr. Leonard's critiques miss the mark

103. In his rebuttal report, Dr. Leonard brings up two main issues, which are related:

- i. He has an aversion to economic theory models and would prefer to see an empirical analysis; and
- ii. He does not trust economic models for rate-setting and prefers benchmarking.

### A. The notion that economic theory is inadequate is naïve

104. Dr. Leonard's expressed aversion to economic modelling depicts a naïve understanding of what economic theory does, and the value of economic models in providing intuition and insights into behaviour.<sup>45</sup>

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<sup>45</sup> Dr. Leonard opines: "Dr. Watt's prediction has failed to bear out because his 'bargaining model' is highly stylized and overly simplified." (Leonard Remand Written Direct Testimony ("Leonard RWDT"), ¶ 18) This is also a surprising comment given that the Services' own experts, such as Dr. Marx, relied on a Shapley model that is stylized and simplified, and Dr. Katz often uses simplified, stylized examples that are devoid of empirical verification, to explain a point. I also reiterate that, in spite of its apparent simplicity, the Nash model is particularly convincing as a description of real-world bargaining because it is the only way the four axioms of bargaining theory (each of which arguably are features of real-world bargaining) can ever be simultaneously satisfied.

105. Economic models are not supposed to be perfect representations of reality, they are intended to isolate what is important, in order to expose a useful insight on some issue of relevance. In that sense, an economic model is similar to a road map; it highlights the useful information and abstracts away the less useful information. A road map may not capture many geographical elements, such as buildings, trees and other structures, the steepness of the roads or the prevailing winds. Yet simple road maps are very useful models, and it is impossible to carry around in one's car a copy of the entire countryside with all of its details. A level of abstraction is necessary to analysis. Economic theory models are useful and instructive.

106. The results of economic models are theorems given the assumptions used to define the model, and therefore they are never "incorrect" in any way (unless it can be shown that the mathematics behind the results contains errors). However, the results do not necessarily deliver predictions of situations that are immune to changes in variables outside the model, but rather the results inform conclusions about the relationships between the variables and parameters within the model itself.

107. In short, one could dismiss an economic model for being overly simplistic, or stylized, or abstracted from many details of real-world situations. But to do so is to ignore exactly the strongest feature of such models, namely that they abstract away from less relevant details in order to clearly highlight important features to be learned. They separate the wheat from the chaff. Models are by nature crude representations of reality, but the lessons and insights that they provide can be very relevant to real-world applications.

108. As an example of this, consider the economic model of perfect competition, which is one of the most important and influential pieces of intellectual thinking that has ever taken place in economics. The perfect competition model of general equilibrium gives analysts many extremely valuable insights as to how complex real-world general equilibrium actually works, and yet it is one of the most "over simplified" and "stylistic" concepts ever invented.



Likewise, the standard Marshallian consumer choice graph that is taught to undergraduates (involving, among other simplifications, a single consumer with perfect information and only two goods) contains many valuable insights and intuition that have shaped our knowledge and understanding of real-world demand and possible interrelationships between goods.

109. Perhaps the message of the usefulness of simplified models was perfectly put forward by one of the founding fathers of bargaining theory, Ariel Rubinstein, who wrote the following:

Economic theory spins tales and calls them models. An economic model is also somewhere between fantasy and reality. Models can be denounced for being simplistic and unrealistic, but modeling is essential because it is the only method we have of clarifying concepts, evaluating assumptions, verifying conclusions and acquiring insights that will serve us when we return from the model to real life.<sup>46</sup>

B. Dr. Leonard's specific complaints are mistaken

110. In paragraph 16 of his remand report, Dr. Leonard claims that I come to the conclusion that, "...if the musical works statutory rate increases by a significant amount, that amount must come from either the labels or the services given that the total amount of the surplus is assumed to be fixed."

111. My model did not assume that the surplus is a fixed constant. It is represented by a *variable*, *R*, which could take on any particular value. The analysis is therefore not subject to a given fixed value of the surplus, although it does assume that when the surplus (whatever value it takes) is to be shared, the parties understand that the amount to be shared is, at that moment, given.<sup>47</sup> That is, the assumption can be restated as "the way the surplus is divided

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<sup>46</sup> Rubinstein, A. (2012), *Economic Fables*, Open Book Publishers; pg. 16.

<sup>47</sup> It is also not particularly difficult to run the bargaining model under the assumption that the surplus to be shared is a random variable (*i.e.*, one that could take on many possible different values). In such a setting, one needs to incorporate into the model risk aversion as a natural feature of the bargaining parties.

does not affect the amount of surplus to divide.” This is a common and reasonable assumption. My analysis, as is common in most of economic theory as far as comparative statics goes, did assume that when we consider an exogenous change (such as an increase in the musical works rate), then everything except the variable of interest (here, the sound recording negotiated rate) is held constant (this is the *ceteris paribus* principle discussed above). This assumption is required if any sort of conclusion around relationships between variables is to be found.<sup>48</sup> Also, I do not analyse a “significant” increase in the statutory rate, but rather my comparative statics exercise is confined to small changes. In my report, I limited discussion to considering the effect of single unit percentage changes in the statutory rate.

112. In paragraph 19 of his remand report, Dr. Leonard likens the exercise of considering the effect of the statutory rate upon the negotiated label rate to the question of marginal cost pass-through to pricing. He concludes that “Theory by itself tells us very little. The extent of pass-through is an empirical question.” This critique reveals a lack of sophistication in understanding how economic theory informs analysis. The Lerner Index, which every undergraduate student of economics should know, shows how the extent of marginal cost pass-through depends on the elasticity of demand and the strategic interaction between firms. The Lerner index is a purely theoretical construct, yet significantly informs

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<sup>48</sup> It is also worth noting that Dr. Leonard sets up but then dodges the question of what happens if one party to a joint enterprise is extracting all the surplus, and then the surplus is reduced. (Leonard RWDT, ¶ 16 (characterizing my conclusion as that, “the labels captured almost all of the surplus prior to the increase and the services virtually none. Thus, almost all of the musical works royalty increase *must* come from the labels.”)) Dr. Leonard simply moves into other open-ended questions, without ever answering what principles we can apply in this situation, which is much the situation the Board was concerned with. Again, Drs. Katz and Marx do not contest this core, consensus principle of bargaining theory, that a party who has extracted all the surplus would, all else equal, be the one to give back if the surplus decreased. To argue otherwise would be to posit that another party would enter into a deal for negative surplus, which is not an acceptable assumption. Dr. Leonard does not explain how he reconciles this position with his critique.



empirical work. In spite of Dr. Leonard's bare opinion, economic theory can do an excellent job of teaching us about marginal cost pass-through.

113. Dr. Leonard's paragraph 21 critiques the use of a two-player bargaining model in my report, and instead posits a multi-player world in which the service (or perhaps Dr. Leonard is considering multiple services) independently negotiates with several different labels, and each label acts strategically by holding out for a higher rate in their own deal hoping that the other labels will be the first to absorb a statutory rate increase. What Dr. Leonard envisages here is a situation known as "Nash in Nash" bargaining, where each individual deal is the result of a Nash bargain (essentially modelled as I did in my report), and the equilibrium outcome over all of the bargaining games is a Nash equilibrium in which each player's strategy is optimal given the strategies of the others. Again, this is entirely possible, but not particularly enlightening vis-à-vis the single bargain setting, as it will not lead to different insights than those distilled by the Board.

114. In paragraph 21 of his remand report, Dr. Leonard also puts forth a particularly interesting comment: "It is within the realm of theoretical possibility that the labels do not agree to *any* reduction in sound recording royalties ..." I find this comment interesting, because it points directly to the biased opinion that Dr. Leonard has. He is willing to entertain one particular outcome being "within the realm of theoretical possibility", while at the same time dismissing that the opposite outcome is not. And this in spite of the fact that the opposite result (that sound recording rates go down when the statutory rate is increased) is actually supported as a "theoretical possibility" (or perhaps, better termed a "theoretical reality") because it has been shown to appear as a feature in a well-accepted economic theory model.<sup>49</sup> In any case, as

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<sup>49</sup> At the same time, while Dr. Leonard considers it a theoretical possibility that labels do not agree to reduce sound recording royalties, he makes no attempt to provide a theoretical model in which such an outcome is a logical result.

I have made clear above in this report, Dr. Leonard's complaint here is empty, as it certainly is a "theoretical possibility that the labels do not agree to any reduction in sound recording royalties", and indeed that theoretical possibility can be straightforwardly found in the Nash bargaining model that I proposed (all that is needed is that the services' non-content costs to revenue ratio falls at the same rate as the statutory musical works rate rises, or that a change in some other variable occurs so that all things are not equal).

C. Dr. Leonard postures as a defender of empirical evidence yet his report ignores the evidence

115. Dr. Leonard states, in paragraph 17 of his remand report, that "Dr. Watt did not provide any empirical support for his 'bargaining model' ..." The usefulness of the model did not require empirical support. The Nash bargaining model has been widely accepted (both in theoretical studies and in empirical studies) as a reasonable portrayal of the way individuals and businesses conduct negotiations. In spite of its simple foundations, the model as originally constructed (which is essentially as I used it), was shown by Nash to be the *only* way that surplus sharing problems could be resolved such that four axioms are simultaneously satisfied, each of which is extremely plausible as something that is desirable or believable in real world bargaining. In short, the Nash model is the *only* way that a surplus can be divided such that:

- i. irrelevant changes in the players' preferences do not change the Nash model bargained outcome,
- ii. there does not exist a feasible sharing rule that is preferred by both bargainers to the solution given by the Nash model,
- iii. in a symmetric bargaining problem, the bargainers end up with symmetric shares, and
- iv. the bargained outcome does not change when irrelevant options (*i.e.*, options that would never be chosen as a solution sharing rule) are included or removed from what is possible.

116. That is, any alternative bargaining model *must* fail to achieve one of those axioms. So, in spite of its apparent simple and stylistic nature, the Nash model is extremely plausible as a description of how real-world bargainers would negotiate.

117. Dr. Leonard states; "... the existing empirical evidence is *inconsistent* with Dr. Watt's bold prediction." (Leonard RWDT, ¶ 17)<sup>50</sup> The so-called "see-saw effect" was never really a "prediction", but rather it is an insight into the outcome of the Nash bargaining solution as applied to the case at hand. And the Board has clearly seen it in that light, using the term "insight" to describe the effect:

... the Judges rely on Professor Watt's insight ... that sound recording royalty rates in the unregulated market will decline in response to an increase in the compulsory license rate for musical works ....

(Final Determination at 73-74)

118. Dr. Leonard argues that an empirical analysis of the relationship between the statutory rate and the negotiated label rate is what is required. However, neither he nor any of the Services' witnesses have provided such an analysis, despite their clients being the ones who possess this data. One reason why is likely that an attempt to capture all aspects of the real world is too complex for a simple statistical exercise involving an econometric regression.<sup>51</sup> There is no obvious data to actually use for some of the independent variables, such as consumer demand equations, costs of entry and exit, a measure of oligopolistic interaction, different timings of different rate bargains, and the actual values of outside options.

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<sup>50</sup> Dr. Leonard gives no attempt to consider the true "existing empirical evidence." Above, in this present report, I have noted that in fact the empirical evidence shows [REDACTED] which is directly consistent with (although, since all other things are *not* equal, was not a requirement of) the "prediction" of my Nash bargaining model. (Eisenach RWRT, §II(A))

<sup>51</sup> It also seems relevant to the Services' decision to omit any empirical analysis that, as we see from Dr. Eisenach's analysis, the actual evidence is completely consistent with the Nash bargaining model and the Board's reasoning on that issue.



Furthermore, the independent variable that would be the statutory rate has likely undergone insufficient change over the recent past to provide enough variance for the regression to work well. There would certainly be problems of multi co-linearity, heteroskedasticity, endogeneity bias, outlier values, and any number of other econometric problems to overcome. And even then, since almost surely it would be impossible to introduce a control variable for each and every possible aspect that could potentially impinge upon the relationship, it could easily lead to such a low  $R^2$ , and/or statistically insignificant key coefficients, as to make the regression meaningless.<sup>52</sup>

D. Dr. Leonard's benchmarking preference rings hollow

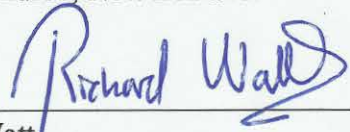
119. According to Dr. Leonard's opinion, "real-world benchmarks are superior to Shapley value modelling for determining rates in this proceeding." (Leonard WDRT, Section V) He opines that "Benchmarks based on real market outcomes provide a substantially more reliable basis for rate setting." (Id. at ¶ 23) However, in spite of his apparent enthusiasm for complex analysis to support claims, he provides absolutely no support for this opinion, other than claiming that the Shapley value is "highly stylized." But there is truly no way to know that a given benchmark, and above all any adjustment that would be required to perform upon a benchmark, is less reliant upon subjective value judgements and underlying assumptions than is a Shapley value analysis. Indeed, it seems quite plain that many benchmarks would be very poor bases for determining rates because they are insufficiently similar or reconciled with the hypothetical market. Indeed, the Board regularly dismisses proposed benchmarks as unreliable in these rate proceedings. Dr. Leonard's argument seems to boil down to the empty statement that a *good* benchmark would be a good way to determine rates, but that just assumes the

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<sup>52</sup> Aside from those issues, it is a common feature that if you "massage" a data set enough in econometric modelling it can be made to tell whatever story you would like it to tell through targeted use of model specifics.

conclusion. Still, if Dr. Leonard truly believes that analysis of “real market outcomes provide a substantially more reliable basis for rate setting,” then he should now be in favour of maintaining the Phonorecords III Rates, since Dr. Eisenach’s analysis amply shows nearly three years of real market outcomes under these rates, during which time there has been sustained growth and success for Google and the interactive streaming industry.

I, Richard Watt, declare under penalty of perjury under the laws of the United States of America that the statements contained herein are true and correct to the best of my knowledge, information and belief. Executed on July 2, 2021 in Christchurch, New Zealand.

  
\_\_\_\_\_  
Richard Watt

**Appendix A: CV of Dr. Richard Watt****1. PERSONAL DATA**

FULL NAME Richard Ian Watt  
 BORN 03/01/1963 (Christchurch, New Zealand)  
 NATIONALITY Dual citizenship; Spanish and New Zealander  
 CURRENT ADDRESS 4 Old Windsor Lane, Off Lower Styx Road, Christchurch 8083 (New Zealand)  
 CONTACT: (64) 021 040 3497, richard.watt@canterbury.ac.nz

**2. ACADEMIC DEGREES**

- Ph.D. in Economics, Universidad Autónoma de Madrid, 31st October 1990. Thesis title: *La Calidad de la Fuerza Laboral: Un Análisis de Equilibrio (The Quality of the Labour Force: An Equilibrium Analysis)*.  
Supervisor: Prof. Felipe Saéz
- Master of Commerce in Economics (Hons.). University of Canterbury, 9th May 1985. Thesis title: *Aggregation and the Unpredictability of Wage Inflation*.  
Supervisor: Prof. Richard Manning
- Bachelor of Commerce. University of Canterbury, 2nd May 1984.

**3. TEACHING POSITIONS HELD**

01/01/2019 – present *Professor*, University of Canterbury  
 01/01/2008 – 31/12/2018 *Associate Professor*, University of Canterbury  
 12/2/2006 – 31/12/2007 *Senior Lecturer*, University of Canterbury  
 13/9/2000 – 11/2/2006 *Profesor Titular (Senior Lecturer with Tenure)*, Universidad Autónoma de Madrid.  
 1/10/87 – 12/9/2000 *Profesor Asociado (Lecturer)*, Universidad Autónoma de Madrid.  
 1984 *Teaching assistant*, University of Canterbury. ECON 101 Tutorials.

**4. TEACHING EXPERIENCE**

Since 1986, at either Universidad Autonoma de Madrid (Spain) and/or University of Canterbury (New Zealand); (i) mathematical microeconomics at all levels of study, (ii) the economics of risk and insurance at all levels of study, (iii) financial economics (advanced undergraduate level), (iv) the economics of innovation and intellectual property (advanced undergraduate level), (v) wine economics (introductory undergraduate level), (vi) game theory (introductory undergraduate level), (vii) environmental economics (advanced undergraduate level), and (viii) macroeconomic theory (introductory and intermediate undergraduate level).

## 5. SABBATICALS AND VISITS TO OTHER UNIVERSITIES

- 8/91 – 12/91 Visiting post-doctoral fellow. Department of Economics, Georgetown University (Washington, U.S.A.)
- February 2004 Visiting Professor. Department of Applied Economics, Université de Paris X Dauphine, (Paris, France).
- February – June 2005 Erskine Fellow, at the Department of Economics, University of Canterbury.
- August-September 2009 Visiting researcher at the Max Planck Institute, Munich, Germany.
- September-October 2010 Visiting researcher at the International Centre for Economic Research, Turin (Italy).
- August 2011 Visiting researcher at the Max Planck Institute, Munich, Germany.
- September-October 2011 Visiting researcher at the International Centre for Economic Research, Turin (Italy).

## 6. PUBLICATIONS

### JOURNALS AND BOOKS

- 1) 2021. “The 2020 Nobel Memorial Prize in Economics: The Canterbury connection”. Forthcoming in *New Zealand Economic Papers*.
- 2) (with Steve Agnew). “The Effect on Student Behaviour and Achievement of Removing Incentives to Complete Online Formative Assessments.” Forthcoming in *Australasian Journal of Educational Technology*.
- 3) 2021. (with Frank Mueller). “Optimal Pricing and Quality of Academic Journals and the Ambiguous Welfare Effects of Forced Open Access: A Two-Sided Model”. Forthcoming in *Managerial and Decision Economics*.
- 4) 2020. “Overlooked Results on the Competitive Firm under Output Price Risk: Alternative Sufficient Conditions for Downward Sloping Factor Demand Curves”, *Economics Letters*, 196; article 109507.
- 5) 2020 (with Philip Gunby). “Time is Money: An Economic Analysis of the Optimal Pacing Problem”, *Mathematical Social Sciences*, 108; 50-61.



- 6) 2020 (with Carlos Fernandez and Francisco Vazquez). "Social Influence on Software Piracy", *Managerial and Decision Economics*, 41; 1211-24.
- 7) 2019 (with Richard Mumo). "Residential Insurance Market Responses After Earthquake: A Survey of Christchurch Dwellers", *International Journal of Disaster Risk Reduction*, 40, article 101166; 1-6.
- 8) 2018 (with Frank Mueller-Langer). "How Many More Cites is a \$3000 Open Access Fee Buying You? Empirical Evidence From a Natural Experiment", *Economic Inquiry*, 56(2); 931-54.
- 9) 2017 (with Seamus Hogan). "Are Athletes on the Right Track? The Effect of Availability of an All-Weather Athletics Track on Athletics Performance", *Sport in Society*, 21(3); 546-57.
- 10) 2017 (with Richard Mumo). "An Investigation of Residential Insurance Demand-Side Reactions After a Natural Catastrophe: The Case of the 2010-11 Christchurch Earthquakes", *Asia Pacific Journal of Risk and Insurance*, 11(2).
- 11) 2017 (with Francisco Vazquez). "An Analysis of Insurance Demand in the Newsboy Problem", *European Journal of Operational Research*, 259(3); 1064-1072.
- 12) 2017 (with Francisco Vazquez and Ignacio Moreno). "Rationality and Honesty of Consumers in Insurance Decisions", *Journal of Economics and Business*, 89; 36-46.
- 13) 2017. Licensing of Copyright Works, *The New Palgrave Dictionary of Economics*, DOI 10.1057/978-1-349-95121-5\_3033-1
- 14) 2016 (with Richard Mumo). "The Dual Insurance Model and its Implications for Insurance Demand and Supply Post-Christchurch Earthquakes in New Zealand", *Insurance and Risk Management*, 83 (3-4); 135-67.
- 15) 2014 (with Francisco Vazquez and Ignacio Moreno). "The Effect of Contract Type on Insurance Fraud", *Journal of Insurance Regulation*, 33(8); 1-34.
- 16) 2014. *The Economics of Copyright: A Handbook for Students and Teachers*, edited volume, Edward Elgar.
- 17) 2013 (with Francisco J. Vazquez). "Allocative Downside Risk Aversion", *International Journal of Economic Theory*, 9(4); 267-77.
- 18) 2013. "Copyright Law and Royalty Contracts for Copyright", in *Handbook of the Digital Creative Economy*, edited by R. Towse and C. Handke, Edward Elgar.
- 19) 2012 (with Francisco J. Vazquez). "The Effect of Prices on Risk Aversion", *Theoretical Economics Letters*, 2(1); 40-44.
- 20) 2011. *The Microeconomics of Risk and Information*, ISBN 978-0-230-280809, Macmillan-Palgrave.

- 21) 2011. “The Economic Theory of Copyright Contracts”, *Journal of Intellectual Property Law*, 18(1); 173-206.
- 22) 2011 (with Francisco J. Vazquez). “Copyright Piracy as Prey-Predator Behaviour”, *Journal of Bioeconomics*, 13(1); 31-43.
- 23) 2009. “How Does Interest Rate Policy Affect Inflation? A Simple General Equilibrium Model With The Interest Rate As The Policy Instrument”, *Review of Economic Design*, 13; 345-60.
- 24) 2009 (with F. Vázquez). “Optimal Accident Compensation Schemes”, *Spanish Economic Review*, 11; 75-82.
- 25) 2009. “An Empirical Analysis of the Economics of Copyright: How Valid Are the Results of Studies in Developed Countries for Developing Countries?”, in *The Economics of Intellectual Property: Suggestions for Further Research in Developing Countries and Countries with Economies in Transition*, World Intellectual Property Organization Publication No. 1012(E); pp. 65-99.
- 26) 2008 (with Ruth Towse). *Recent Trends in the Economics of Copyright* (edited volume), Edward Elgar.
- 27) 2008 (with Henri Loubergé). “Insuring a Risky Investment Project”, in *Insurance, Mathematics and Economics*, 42; 301-310.
- 28) 2007, “What Can the Economics of Intellectual Property Learn From the Economics of Insurance?”, in *Review of Law and Economics*, Article 3, Issue 3.
- 29) 2006 (with Stan Liebowitz), “How Best to Remunerate Creators in the Market for Music: Copyright and its Alternatives”, in *Journal of Economic Surveys*, 20(4); 513-545.
- 30) 2006 (with Ruth Towse), “Copyright Protection Standards and Authors’ Time Allocation”, in *Industrial and Corporate Change*, 15(6); 995-1011.
- 31) 2006 (with F. Vázquez and I. Moreno), “Can Bonus-Malus Alleviate Insurance Fraud?”, in *Journal of Risk and Insurance*, 73(1); 123-51. Winner of the Witt Award for the best paper published in *Journal of Risk and Insurance* during 2006.
- 32) 2005, “Adverse Selection and the Legal Protection of Intellectual Property Rights”, in F. Leveque and H. Shelanski (Eds.), *Antitrust, Patent and Copyright*, Edward Elgar Publishing Ltd; pp. 127-48.
- 33) 2005, “A Unifying Theory of Copyright and Patent”, in *International Journal of the Economics of Business*, 12(3), 389-402.
- 34) 2005 (with Arthur Snow), “Risk Sharing and the Distribution of Copyright Collective Income”, in L. Takeyama, W. Gordon and R. Towse (Eds.), *Developments in the Economics of Copyright: Research and Analysis*, Edward Elgar Publishing Ltd; pp. 23-36

- 35) 2003 (with Wendy Gordon, Eds.) *The Economics of Copyright: New Developments in Research and Analysis*. ISBN 1 84376 263 3, Edward Elgar Publishing Ltd.
- 36) 2003 (with Jorge Alonso). “Efficient Distribution of Copyright Income”, in Gordon, W. and R. Watt (eds.), *The Economics of Copyright: New Developments in Research and Analysis*, Edward Elgar Publishing Ltd, pp. 81-103.
- 37) 2003. “Curtailling Ex-post Fraud in Risk Sharing Arrangements”, *European Journal of Law and Economics*, 16 (2), 247-263.
- 38) 2003 (with Carlos Rodriquez) “El Mercado Español de Carburantes: Un Análisis de Oligopolio”, *Economía Industrial*, 353, 123-8.
- 39) 2002. “A Generalized Oligopoly Model”, *Metroeconomica*, 53 (1), 78-85.
- 40) 2002. “Defending Expected Utility Theory”, *Journal of Economic Perspectives*, 16 (2), 227-228.
- 41) 2002 (with F. Vázquez). “The Price of Risk with Incomplete Knowledge on the Utility Function”, *Theory and Decision*, 53 (3), 271-287.
- 42) 2001 (with F. Vázquez and I. Moreno). “An Experiment on Rationality in Insurance Decisions”, *Theory and Decision*, 51 (3), 247-296.
- 43) 2000. *Copyright and Economic Theory: Friends or Foes?* ISBN 184064 3129. Edward Elgar Publishing Ltd.
- 44) 1999. “The Zero Fraud Indemnity Function for Insurance Contracts”, *Études et Dossiers*, 225, 147-164.
- 45) 1999 (with F. Vázquez). “A Theorem on Multi-Period Insurance Contracts Without Commitment”, *Insurance: Mathematics and Economics*, 24, 273-280.
- 46) 1997. “The Optimal Trading Partner for Reciprocal Insurance Treaties”, *Scandinavian Actuarial Journal*, 2, 97-112.
- 47) 1997 (with F. Vázquez). “Full Insurance, Bayesian Updated Premiums and Adverse Selection”, *The Geneva Papers on Risk and Insurance Theory*, 22 (2), 135-150
- 48) 1996 (with F. Vázquez). “Un Análisis Teórico-Comparativo de los Contratos de Seguros Bonus-Malus”, *Anales del Instituto de Actuarios 1995*, 139-161.
- 49) “Las Interrelaciones Entre la Microeconomía y la Macroeconomía: el Problema de la Agregación Consistente”, *Cuadernos de Economía*, 20, 437-456.

Translator (Spanish to English) for Oxford University Press of the 1997 and 2000 editions of *An Introduction to the Economics of Information: Incentives and Contracts*, by Inés Macho Stadler and David Pérez Castrillo (first published in 1994 by Ariel Economica).

PAPERS PUBLISHED IN REVIEW OF ECONOMIC RESEARCH ON COPYRIGHT ISSUES

- 50) 2018 (with Frank Muller-Langer). “Indirect Copyright Infringement Liability for an ISP: An application of the theory of the economics of contracts under asymmetric information”, *Review of Economic Research on Copyright Issues*, 15(2); 57-79.
- 51) 2015. “The Efficiencies of Aggregation: An Economic Theory Perspective on Collective Management of Copyright”, *Review of Economic Research on Copyright Issues*, 12(1/2); 26-45.
- 52) 2011. “Revenue Sharing as Compensation for Copyright Holders”, *Review of Economic Research on Copyright Issues*, 8(1); 51-97.
- 53) 2010. “Fair Copyright Remuneration: The Case of Music Radio”, *Review of Economic Research on Copyright Issues*, 7(2); 21-37.
- 54) 2010 (with Frank Muller-Langer). “Copyright and Open Access for Academic Works”, *Review of Economic Research on Copyright Issues*, 7(1); 45-65.
- 55) 2007. “Patent and/or Copyright for Software: What Has Been Done So Far?”, *Review of Economic Research on Copyright Issues*, 4(1); 3-14.
- 56) 2006. “Licensing and Royalty Contracts for Copyright”, *Review of Economic Research on Copyright Issues*, 3(1); 1-17.
- 57) 2004. “The Past and the Future of the Economics of Copyright”, in *Review of Economic Research on Copyright Issues*, 1(1), 151-172.
- 58) 2004. “A Comment: The ‘Copyright Factors’”, in *Review of Economic Research on Copyright Issues*, 1(1), 71-78.

WORK IN PROGRESS

- 1) (with B. Davies) Bundling or Separating of Independent Risks for Insurance Purposes.
- 2) “Some Similarities Between Greater Risk Aversion and Greater Downside Risk Aversion”.
- 3) “A Note on The Comparative Statics of Nash Bargaining Under Risk”.
- 4) “A New Approximation for the Risk Premium with Large Risks”.

**7. PRESENTATIONS AT INTERNATIONAL CONGRESSES**

- 1) “Old and New Results in Entrepreneurship Under Risk” (with Claudio Bonilla and Marcos Vergara), presented at the World Risk and Insurance Economics Congress, New York (USA), August 2020.

- 2) “On a New Paradigm of Optimal Insurance Demand and Savings in an Intertemporal Framework: Why is post-accident insurance so high?” (with Richard Mumo), presented at the American Risk and Insurance Association Annual Conference, San Francisco (USA), August 2019.
- 3) “Bundling and Insurance of Independent Risks” (with B. Davies), presented at the European Group of Risk and Insurance Economists Annual Seminar, London (UK), September 2017.
- 4) “The Efficiencies of Aggregation: An Economic Theory Perspective on Collective Management of Copyright”, Invited Keynote Speech at the European Policy on Intellectual Property Congress, Glasgow (UK), September 2015.
- 5) “An Analysis of Insurance Demand in the Newsboy Problem” (with F. Vazquez), presented at the World Risk and Insurance Economics Congress, Munich (Germany), August 2015.
- 6) “Some Similarities Between Greater Risk Aversion and Greater Downside Risk Aversion”, presented at the International Congress “Risk and Choice: A Conference in Honour of Louis Eeckhoudt”, Toulouse (France), July 2012.
- 7) “The Effect of Contract Type on Insurance Fraud” (with F. Vazquez and I. Moreno), presented at the Behavioral Economics Workshop, University of Munich (Germany), December 2011.
- 8) “The Effect of Contract Type on Insurance Fraud” (with F. Vazquez and I. Moreno), presented at the Annual Congress of the European Group of Risk and Insurance Economists, Vienna (Austria), September 2011.
- 9) “Revenue Sharing as Compensation for Copyright Holders”, presented at the Annual Congress of the New Zealand Association of Economists, Wellington (New Zealand), June 2011.
- 10) “Allocative Downside Risk Aversion” (with F. Vazquez), presented at the World Risk and Insurance Economics Congress, Singapore, July 2010.
- 11) “Allocative Downside Risk Aversion” (with F. Vazquez), presented at the Annual Congress of the New Zealand Association of Economists, Auckland (New Zealand), June 2010.
- 12) “How Does an Increase in Risk Affect Insurance Demand? Experimental Evidence” (with Steve Tucker and Maros Servatka), presented at the Annual Congress of the Economic Science Association, Melbourne (Australia), February 2010.
- 13) “How Does an Increase in Risk Affect Insurance Demand? Experimental Evidence” (with Steve Tucker and Maros Servatka), presented at the Annual Congress of the European Group of Risk and Insurance Economists, Bergen (Norway), September 2009.
- 14) “The More The Merrier? Information and Information Gathering in Insurance Markets” (with Sam Mills), presented at the Annual Congress of the European Group of Risk and Insurance Economists, Toulouse (France), September 2008.

- 15) “The More The Merrier? Information and Information Gathering in Insurance Markets” (with Sam Mills), presented at the FUR International Congress, Barcelona (Spain), July 2008.
- 16) “A New Approximation to the Risk Premium With Large Risks”, presented at the Geneva Association of Risk and Insurance Economists Annual Congress, Cologne (Germany), September 2007.
- 17) “Copyright Piracy as Prey-Predator Behavior” (with F. Vázquez), 2007 Annual Congress of the Society for Economic Research on Copyright Issues, Berlin (Germany), July 2007.
- 18) “A More Reasonable Model of Insurance Demand: Clarifications and Further Results” (with H. Loubergé), Annual Congress of the New Zealand Association of Economists, Christchurch (New Zealand), June 2007.
- 19) “A Note on The Effect of an Increase in the Probability of Loss When Risk is Endogenous” (with H. Loubergé), Western Risk and Insurance Association, Santa Barbara (USA), January 2006.
- 20) “A Note on The Effect of an Increase in the Probability of Loss When Risk is Endogenous” (with H. Loubergé), World Risk and Insurance Economics Congress, Salt Lake City (USA), August 2005.
- 21) “On the Demand for Budget Constrained Insurance” (with H. Loubergé), 31st Annual Seminar of the European Group of Risk and Insurance Economists, Marseille (France), September 2004.
- 22) “On the Demand for Budget Constrained Insurance” (with H. Loubergé), 42nd Annual Congress of the Risk Theory Society, New York (USA), April 2004.
- 23) “How Different are Copyright and Patent? How Different Should They Be?”, International Conference on Antitrust, Patent and Copyright, Paris (France), January 2004.
- 24) “A Simple Model of Insurance with Direct Utility”, 30th Annual Seminar of the European Group of Risk and Insurance Economists, Zurich (Switzerland), September 2003.
- 25) “Risk Sharing and the Distribution of Copyright Collective Income” (with Arthur Snow), 2nd Annual Congress of the Society for Economic Research on Copyright Issues, Northampton, MA. (USA), June 2003.
- 26) “Can Bonus-Malus Alleviate Insurance Fraud?” (with F. Vázquez and I. Moreno), International Insurance Fraud Congress. Insurance Claim Fraud: Developing the Models and Mining the Data, Newport, Rhode Island (USA), November 2002.
- 27) “Can Bonus-Malus Alleviate Insurance Fraud?” (with F. Vázquez and I. Moreno), 29th Annual Seminar of the European Group of Risk and Insurance Economists, Birmingham (UK), September 2002.

- 28) “Efficient Distribution of Copyright Income” (with J. Alonso), 1st Annual Congress of the Society for Economic Research on Copyright Issues, Madrid (Spain), May 2002.
- 29) “Optimal Accident Compensation Schemes” (with F. Vázquez), 40th Annual Congress of the Risk Theory Society, University of Illinois, Champagne (U.S.A.), April 2002.
- 30) “A Comparison of Two Insurance Contract Formats: Experimental and Theoretical Evidence” (with F. Vázquez and I. Moreno), 28th Seminar of the European Group of Risk and Insurance Economists, University of Strasbourg (France), September 2001.
- 31) “An Experiment on Rationality in Insurance Decisions” (with F. Vázquez and I. Moreno), 10th Congress of Foundations of Uncertainty and Rationality, University of Turin (Italy), May 2001.
- 32) “Wholesale Natural Gas Markets in Countries Without Production: The Case of Spain” (with J. Quinto), Transport and Public Utilities Group, American Economic Association Annual Meetings, New Orleans (USA), January 2001.
- 33) “Support Contingent Insurance: The Optimal Deductible and Dominance of the Traditional Contract” (with F. Vázquez), 27th Seminar of the European Group of Risk and Insurance Economists, Rome (Italy), September 2000.
- 34) “Support Contingent Insurance: The Optimality of Supplementary Coverage” (with F. Vázquez), 38th Annual Congress of the Risk Theory Society, University of Minnesota, Minneapolis (USA), April 2000.
- 35) “The Zero Fraud Indemnity Function for Insurance Contracts,” 26th Seminar of the European Group of Risk and Insurance Economists, Madrid (Spain), September 1999.
- 36) “The Zero Fraud Indemnity Function for Insurance Contracts,” American Risk and Insurance Association Annual Congress, Vancouver (Canada), August 1999.
- 37) “Spanish Electricity Market Organization” (with J. Quinto), American Economic Association Annual Meeting, New York (USA), January 1999.
- 38) “The Welfare Implications of the Underlying Industrial Configuration: A Generalized Version of the Generalized Stackelberg Oligopoly Model,” Symposium on Economic Theory, Universidad Autónoma de Barcelona (Spain), December 1998.
- 39) “Sufficient Conditions for Insurance Premiums with Unknown Utility Function” (with F. Vázquez), 25th Seminar of the European Group of Risk and Insurance Economists, University of Vienna (Austria), September 1998.
- 40) “On the Optimal Regulation of Oligopolistic Industries” (with J. Quinto), American Economic Association Annual Meetings, Chicago (USA), January 1998.

- 41) “Implicit Client Sorting and Bonus-Malus Contracts” (with F. Vázquez), 35th Annual Congress of the Risk Theory Society, University of Alabama, Tuscaloosa (USA), April 1997.
- 42) “Endogenous Premium Insurance Contracts and Adverse Selection” (with F. Vázquez), 23rd Seminar of the European Group of Risk and Insurance Economists, University of Hannover (Germany), September 1996.
- 43) “The Optimal Trading Partner for Reciprocal Insurance Treaties,” American Risk and Insurance Association Annual Congress, Philadelphia (USA), August 1996.
- 44) “The Optimal Trading Partner for Reciprocal Insurance Treaties,” 22nd Seminar of the European Group of Risk and Insurance Economists, Université de Genève, Geneva (Switzerland), September 1995.

## 8. OTHER (SELECTED) SEMINARS

- “Revenue Sharing as Copyright Remuneration”, Department of Economics, University of Eastern Piedmont, Alessandria (Italy), September 2010.
- “Can Bonus-Malus Alleviate Insurance Fraud?” Department of Economics, University of Canterbury, Christchurch (New Zealand), August 2004.
- “The Intersection between Patent and Copyright”, XVII International Summer School on “Intellectual Property, Innovation and Competition”, University of Siena, Siena (Italy), July 2004.
- “A Simple Introduction to the Economics of Copyright”, Department of Applied Economics, Université de Paris X (Dauphine), Paris (France), February 2004.
- “Price Setting for Intellectual Property”, V International SGAE Conference on Intellectual Property: Competition and Collective Management, Madrid (Spain), November 2001.
- “Social Welfare in a Generalized Oligopoly Model”, Department of Economics, Monash University, Melbourne (Australia), August 2000.
- “Horizontal Mergers in Oligopolistic Industries: The Herfindahl-Hirshman Index and Social Welfare” (with J. Quinto), Department of Economics, Universidad San Pablo CEU, Madrid (Spain), June 2000.
- “The Zero Fraud Indemnity Function for Insurance Contracts”, Department of Economics, University of Canterbury, Christchurch (New Zealand), July 1999.
- “Insurance Company Implicit Client Selection in Bonus-Malus Contracts” (with F. Vázquez), Department of Economic Analysis, Universidad Autónoma de Madrid, Madrid (Spain), February 1997.



“Intertemporal Insurance Contracts and Adverse Selection” (with F. Vázquez), The Institute of Law and Economics, Universidad Carlos III de Madrid, Madrid (Spain), October 1996.

“Market Failure and the Theory of Monopoly and Oligopoly”, P.E.R.E., Faculty of Law, Universidad Autónoma de Madrid, Madrid (Spain), October 1995.

## 9. RECENT RESEARCH GRANTS

2020. 6 month grant from the Ministry of Business, Innovation and Employment (New Zealand) to evaluate the insurable liability risk of launches of orbiting satellites from New Zealand territory.

2013 (with F. Mueller). One year grant from NBER for research on the effect of the hybrid open access format of journal publishing upon journals and authors, especially upon citation rates.

2011-12 (with F. Mueller). “TILEC IIPC Grant: Two-sided markets, academic publishing and open access.” One year grant from University of Tilburg – Tilburg Law and Economics Centre (Holland) to finance theoretical research on academic publishing.

2010-11 (with F. Vazquez and I. Moreno). “MAPFRE Research Fund: Experiments and Insurance Fraud”. One year grant from MAPFRE (Spain) to carry out experimental research on insurance fraud.

2009 (with B. Manley). “Forestry Insurance, Risk Pooling and Risk Minimising Options”, Ministry of Agriculture and Forestry (MAF) Project CM-09 under MAF POL 0809-11194. One year grant from the MAF (New Zealand) to research on risks and insurance in forestry.

## 10. OTHER ACCOMPLISHMENTS

2014-17, PhD thesis supervisor of Richard Mumo, University of Canterbury. Thesis on the insurance market effects of natural catastrophes.

2009, Member of Special Group of Experts, chosen by the *World Intellectual Property Organization* to develop a methodology to evaluate the economic effects of copyright. Group met in Geneva (Switzerland), November 2009.

September 2008-September 2009, President of the European Group of Risk and Insurance Economists.

2004-present, General Secretary of the Society for Economic Research on Copyright Issues.

2004-present, Managing Editor, Review of Economic Research on Copyright Issues.

2005-present, Member of the Scientific Committee for the Ernst-Meyer Prize in the Economics of Insurance (international prize offered annually to the best PhD thesis in insurance economics, by the Geneva Association).

2002-04, President of the Society for Economic Research on Copyright Issues.

2002, Member of Special Group of Experts, chosen by the *World Intellectual Property Organization* to develop a methodology to evaluate the economic impact of copyright on national economies. Group met in Helsinki (Finland), July 2002.

2001, founder of the Society for Economic Research on Copyright Issues.

2000-03, PhD thesis advisor for Ignacio Moreno, in the Department of Economics, Universidad Autónoma de Madrid. Thesis concerning optimal fraud in insurance models.

Submissions referee for Scandinavian Actuarial Journal, Journal of Risk and Insurance, Economic Journal, American Economic Review, Journal of Institutional Economics, Geneva Papers on Risk and Insurance Theory, European Journal of Operational Research, (among others).

## APPENDIX B

## Materials Relied Upon by Professor Watt

**Academic Books, Journal Articles, and other Academic Literature**

- Adelman, M. (1948), “Effective Competition and the Antitrust Laws,” *Harvard Law Review*, Vol. 61
- Bender, C.M, G. Götz and B. Pakula (2011), “Effective Competition: Its Importance and Relevance for Network Industries,” *Intereconomics*, 1
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### **Restricted Documents**

#### **16-CRB-0003-PR (2018-2022) (Remand)**

- Remand Written Rebuttal Testimony of Jeffrey A. Eisenach
- Written Direct Remand Testimony of Leslie M. Marx
- Written Direct Remand Testimony of Christopher Bonavia
- Written Direct Remand Testimony of Benjamin Kung
- Written Direct Remand Testimony of Leslie M. Marx
- Written Direct Remand Testimony of Michael L. Katz
- Written Direct Remand Testimony of Waleed Diab
- Written Direct Remand Testimony of George White
- Written Direct Remand Testimony of Gregory K. Leonard
- Written Direct Remand Testimony of Rishi Mirchandani
- Services’ Joint Written Direct Remand Submission
- Amazon’s Responses and Objections to Copyright Owners Interrogatories (May 7, 2021)
- Google’s Responses and Objections to Copyright Owners Interrogatories (May 7, 2021)
- Pandora’s Responses and Objections to Copyright Owners Interrogatories (May 7, 2021)
- Spotify’s Responses and Objections to Copyright Owners Interrogatories (May 7, 2021)

#### **16-CRB-0003-PR (2018-2022)**

- Written Rebuttal Testimony of Michael L. Katz
- Written Rebuttal Testimony of Richard Watt
- Written Rebuttal Testimony of Jeffrey A. Eisenach
- Written Direct Testimony of Marc Rysman
- Written Rebuttal Testimony of Joshua Gans
- Deposition of Michael L. Katz, dated June 8, 2021
- Deposition of Leslie M. Marx, dated June 2, 2021

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*Remand Written Rebuttal Testimony of Richard Watt (PhD)*  
*Dkt No.: 16-CRB-0003-PR (2018-2022) (Remand)*

- Transcript of Hearing Testimony

**Legal**

- *Determination of Royalty Rates and Terms for Making and Distributing Phonorecords (Phonorecords III)*, November 5, 2018 (Restricted)
- *Determination of Royalty Rates and Terms for Transmission of Sound Recordings by Satellite Radio and “Preexisting” Subscription Services (SDARS III)*, 83 FR 65210 (Dec. 19, 2018)

**TAB E**

**CO Rem. Ex. U**  
**FILED UNDER SEAL**

# Proof of Delivery

I hereby certify that on Wednesday, October 20, 2021, I provided a true and correct copy of the Volume IV.B - Written Direct Testimony of Robyn Flynn, Daniel Spulber, and Richard Watt to the following:

Johnson, George, represented by George D Johnson, served via ESERVICE at george@georgejohnson.com

Zisk, Brian, represented by Brian Zisk, served via ESERVICE at brianzisk@gmail.com

Amazon.com Services LLC, represented by Joshua D Branson, served via ESERVICE at jbranson@kellogghansen.com

Joint Record Company Participants, represented by Susan Chertkof, served via ESERVICE at susan.chertkof@riaa.com

Pandora Media, LLC, represented by Benjamin E. Marks, served via ESERVICE at benjamin.marks@weil.com

Google LLC, represented by Gary R Greenstein, served via ESERVICE at ggreenstein@wsgr.com

Spotify USA Inc., represented by Joseph Wetzel, served via ESERVICE at joe.wetzel@lw.com

Apple Inc., represented by Mary C Mazzello, served via ESERVICE at mary.mazzello@kirkland.com

Powell, David, represented by David Powell, served via ESERVICE at davidpowell008@yahoo.com

Signed: /s/ Benjamin K Semel